The Mining Journal

Established 1835 — Railway & Commercial Gazette

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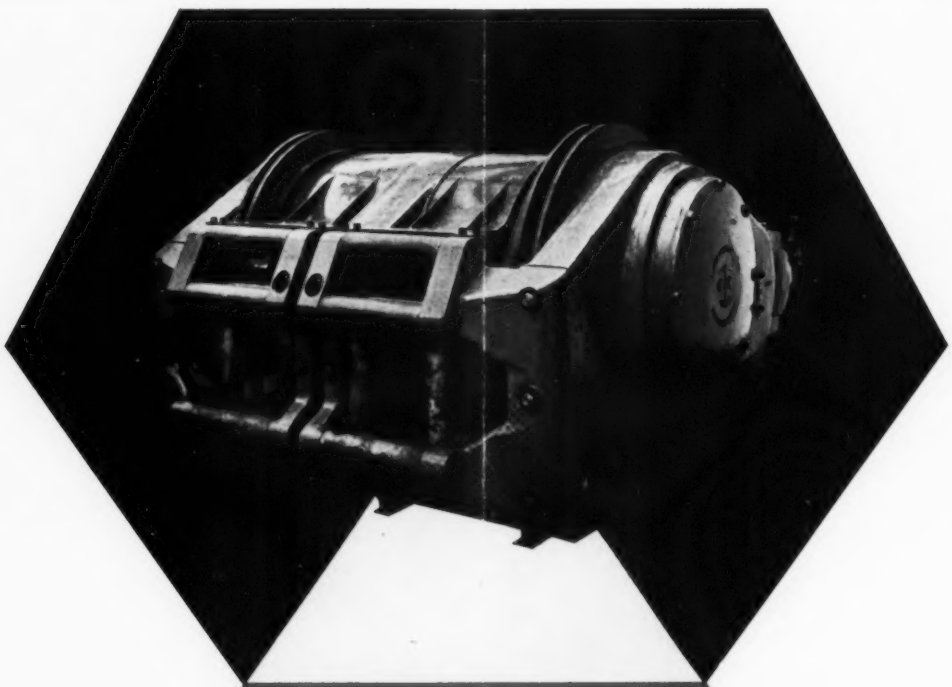

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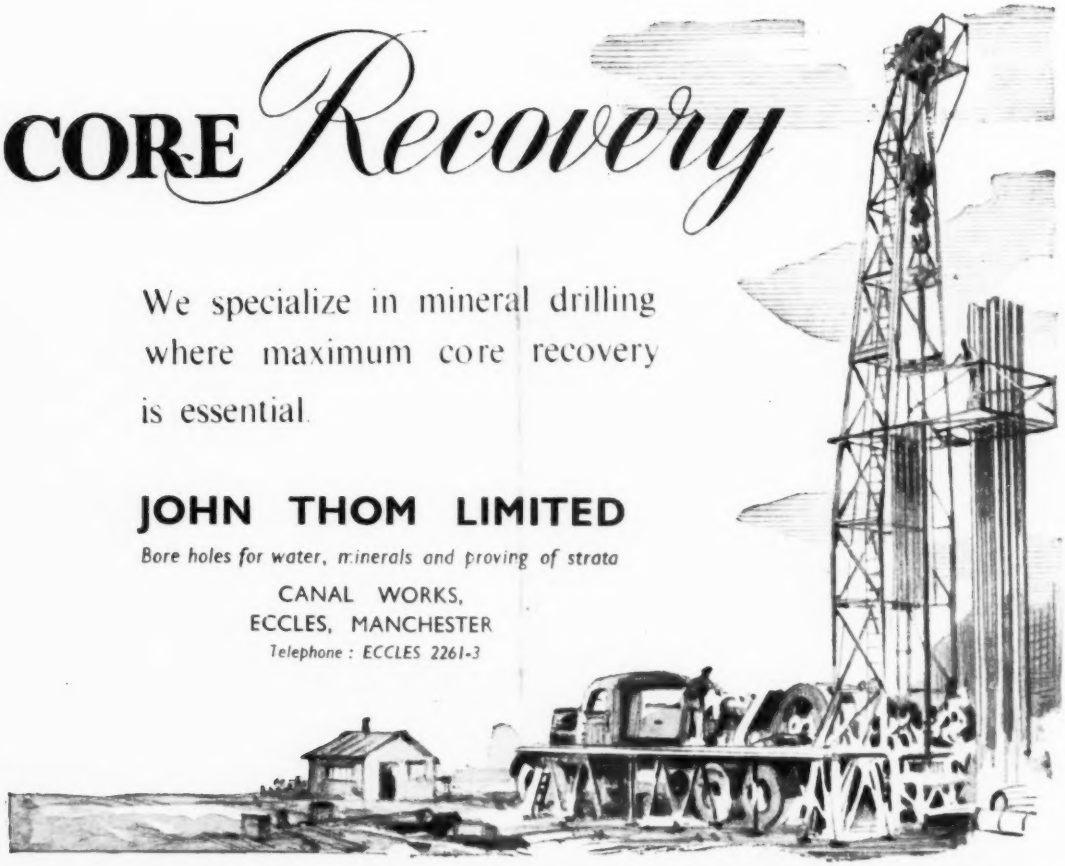

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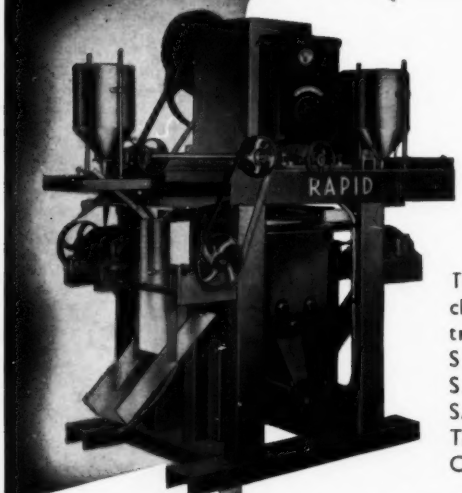

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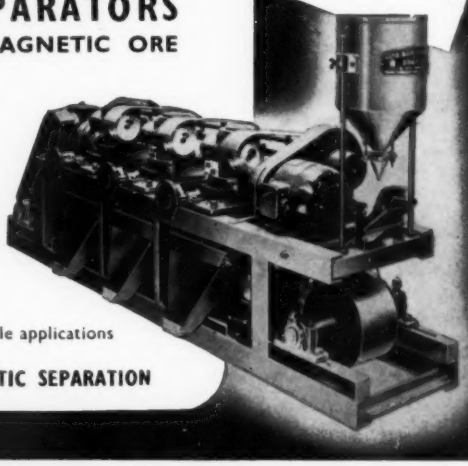

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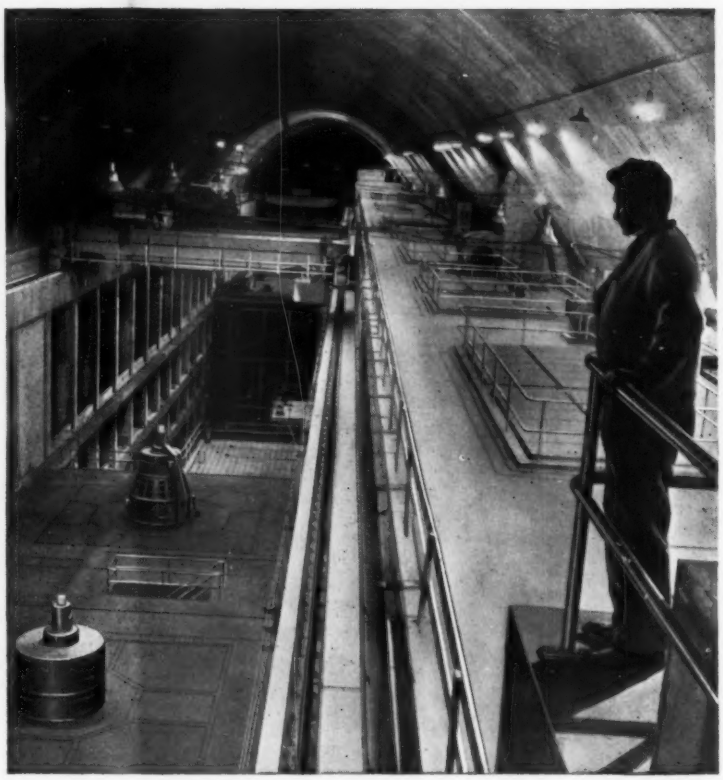
Aluminium Union Limited distributes aluminium ingot produced by Aluminum Company of Canada, Ltd., in addition to exporting the products of the various fabricating companies within the Aluminium Limited group.



At Kemano, the cavern in the mountain houses the vast generators supplying Kitimat with power. The panoramic view below shows a section of the Kitimat smelter.

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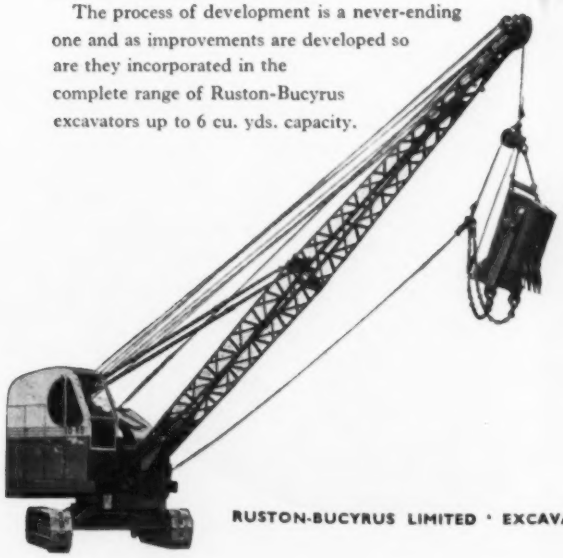

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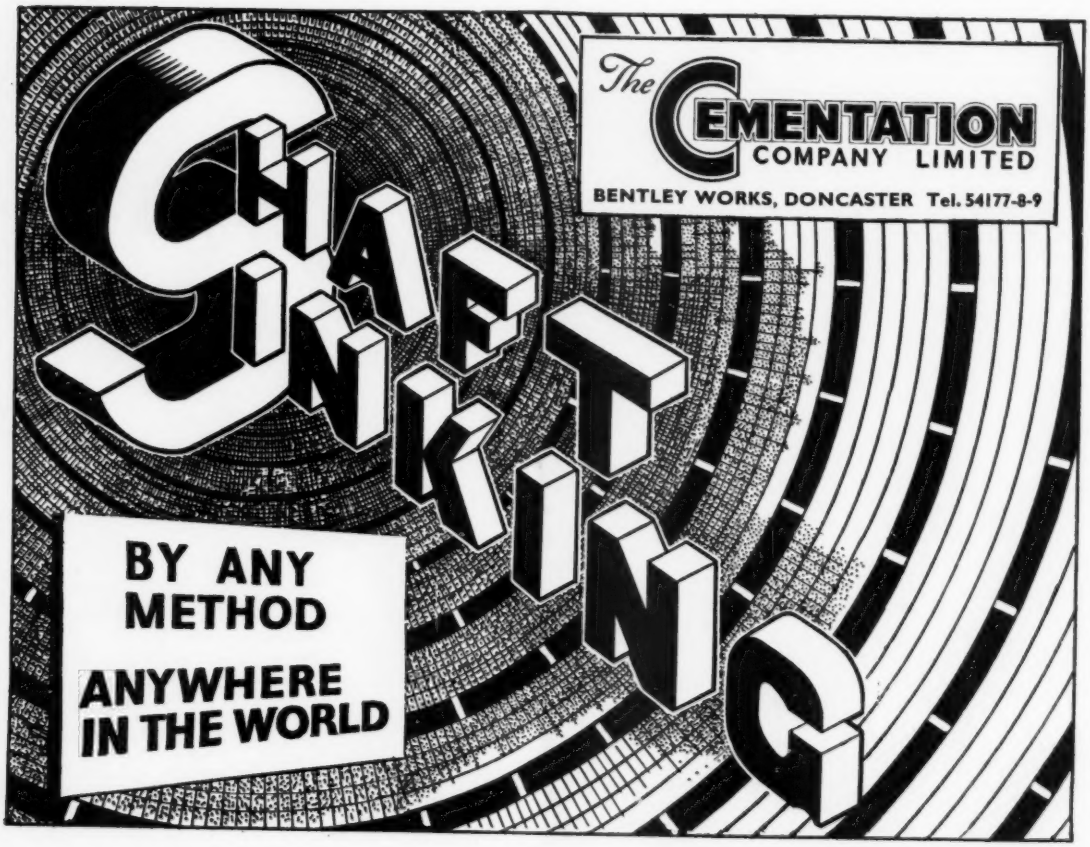

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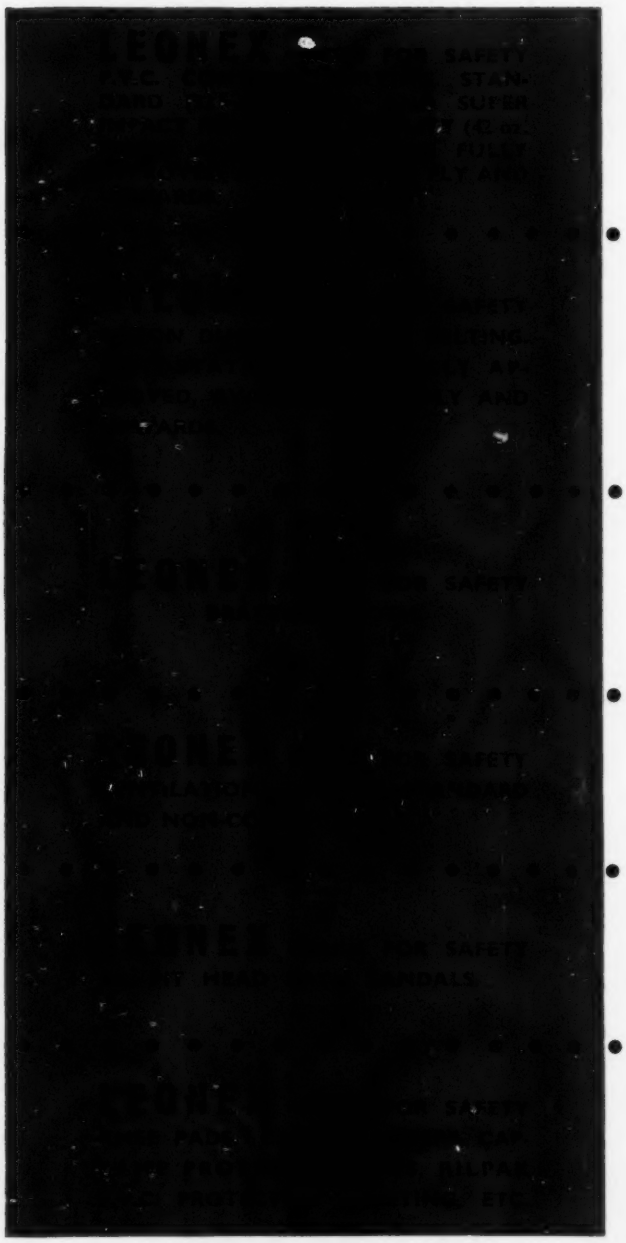

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The Mining Journal

Established 1835

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NOTES AND COMMENTS

The Writing on the Dam Wall

Let us not allow sentiment to distort perspective when considering the implications of the contracts so far awarded for the construction of the Kariba Dam.

Regarding this setback from a strictly financial standpoint, the United Kingdom can find consolation for the loss of the two largest contracts in the reflection that British engineering concerns are to share orders worth about £5,000,000, while an Italian company erecting the initial transmission system will spend about £4,000,000 on British equipment. It is by no means improbable that, in terms of direct financial benefits, the U.K. will even do better than Italy, since the greater part of the £25,300,000 involved in the main contract (which includes construction of the 400 ft. high dam) will be spent inside Rhodesia on the hire of labour and purchase of materials. Moreover, U.K. contractors have obtained a substantial share of the orders placed in connection with the first stage of the project, the cost of which is officially estimated at £78,900,000. Apart from the business resulting directly or indirectly from the contracts awarded this week, British firms secured orders worth £10,800,000 for preliminary works of varying descriptions including housing, access roads, petrol and transport.

The fact remains that failure to secure either of the two principal contracts, which together aggregate more than £35,000,000 is a damaging blow to British prospects and prestige, which is particularly galling in view of the very large part played by British capital in financing the Kariba project. The Copperbelt companies, together with Chartered, are finding nearly half the finance for the first stage of the scheme, while loans of £15,000,000 and £3,000,000 have been made available by the Colonial Development Corporation and the Commonwealth Development Finance Company.

It is evident, that in this financial climate, the inclination, subject to overruling considerations, would be to place as much business as possible with U.K. firms. In tendering for the civil engineering work U.K. constructors were associated with American and also with Belgian and French companies. In mitigation of the failure of these groups to secure the main civil engineering contract, it has been pointed out that the Italians have much greater experience in dam construction and hydro-electric work. The claim has also been made that the Italian bids were based on the lower level of wages and accommodation accepted by Italian labour. It is possible, too, that the profit margins were smaller than would be acceptable to British firms. Be that as it may, the fact remains that the Italians have secured a major success which will encourage and assist them to tender for contracts in connection with other large engineering projects in Africa and elsewhere. It is less easy to find convincing reasons for the failure of British firms to secure the contract, valued at £9,935,844, for the supply and erection of overhead transmission lines, though, to a lesser extent, the lower wage standards of Italian labour may again have been a factor.

In the Rhodesias, South Africa, Australia and many other countries, U.K. firms still benefit from a vast store of goodwill, which is of incalculable value to exporters. It is becoming increasingly evident, however, that in no part of the world—whether inside or outside the Commonwealth or even in the United Kingdom itself—are customers prepared to pay large sums for the privilege of buying British.

Electrical equipment from Commonwealth sources is admitted to the Federation duty free, whereas the products of foreign competitors are subject to a 10 per cent import duty. Similar preferences apply to other classes of machinery. The view has been expressed in the Rhodesias that if, despite these preference margins, British interests are still unable to compete, they can hardly complain if contracts are placed elsewhere. The Federal Power Board can scarcely be blamed for putting this very reasonable policy into practice. Indeed, it had virtually no alternative but to submit the contracts to independent international tender, since £28,600,000—over a third of total cost of the initial stage—is being met by a World Bank Loan.

Having regard to the high cost of capital equipment and the paramount importance of halting the persistent rise in working costs, the mining industry, whatever its political affiliations and sympathies, cannot but concur with the principle that buying policy should be dictated primarily by price, delivery times, after-sales service, and, of course,

the quality and suitability of the equipment or services offered.

A very large number of mining companies in all five continents will share our hope that, in the highly competitive conditions of modern trade, these requirements will in future be met by British firms. It by no means follows that the U.K. tenderers are themselves to blame for losing the major Kariba contracts, which may be due wholly or partially to circumstances outside their control. Although the loss of these orders may cost Britain little beyond prestige, the time is clearly overdue for critical examination of the reasons for the ability of the Italians to underbid British firms. To a nation which depends for its prosperity and even its very survival on its ability to sell goods and services overseas, the writing on the unbuilt wall of the Kariba dam has a significance that cannot be ignored.

Are Synthetic Metals Possible?

Discussing the possibility that at some future date metals might be produced synthetically, a contributor to *The Mining Journal Review 1956* pointed out that controlled thermonuclear reactions were not at present practicable. It would be simpler, he contended to carry out mining on the moon.

While there have been no published developments to cast any doubt on the soundness of this view, it is noteworthy that scientific investigations which might ultimately lead to the synthesis of metals are already being undertaken. According to the director of research at Brigham Young University, hundreds of new compounds now unknown to Earth will result from research just beginning on high temperatures and high pressures.

Mr. Tracy Hall, who is accredited with the production of the first synthetic diamond, stated at a recent symposium in the U.S. that these new compounds might provide answers to some of the most stubborn problems of modern technology. Among them are rocket metals that will finally overcome the barrier to successful space flight presented by the extremely high temperatures generated by rockets on leaving and returning to earth. High pressures, used alone or in combination with high temperatures, produce strange reactions. Melting points of metals under pressure have been lowered 600 deg. C. or raised 1,000 deg.

Mr. Hall predicted that ammonia would soon be changed from its normal gas state into metallic form, having the appearance as well as the electrical conductivity and bending properties of soft metal. This will occur when ammonia is subjected to atmospheric pressure 200,000 times greater than normal. It is not expected to stay in its new form when the pressure is released, but future studies will undoubtedly provide means of creating other new metals that will remain stable.

Mr. Hall's invention of the scientific apparatus known as "The Belt" enabled diamonds to be produced synthetically from carbon materials. It is possible that materials which are even harder than the diamond might be produced by utilizing high temperatures or high pressures or a combination of the two. Compounds with potentialities for producing harder-than-diamond materials are the borides, carbides and nitrides. Such apparatus as "The Belt" may enable new compounds to be produced by creating electronic orbis in atoms of present substances. In this way it might be possible to obtain a new aluminium, for example, with a behaviour which is completely different from that of the existing metal.

Mr. S. D. Kistler, dean of the College of Engineering at the University of Utah, described some of the weird changes produced by high temperatures and high pressures. Lubricating oils and graphite change into solids and become abrasives, the melting points go up or down, steel bends, brittle minerals gain strength, other substances become hard or soft, chemical reactions are sluggish.

The large-scale synthesis of metals is as yet far too remote a prospect to be taken into practical consideration when assessing the long-term outlook for the mining industry, which, in any event, might be called on to produce many of the materials required for the production of future metals. Mining on the moon may well be a simpler proposition, as our contributor suggested, but having regard to the phenomenal progress of chemical and metallurgical technology, even this possibility, however fantastic it may appear in this earth-bound era, can by no means be entirely dismissed.

Mining Expands in the Philippines

Mining activity in the Philippines, which has been increasing steadily since the end of the second world war, reached a new peak in 1955, with an output of metallic and non-metallic minerals valued at a total of 167,781,916 pesos—an increase of 14 per cent over the previous year. The Philippine peso is officially valued at $0.50, but current free market quotations are in the region of $0.37.

Gold still retains its place as the leading mine product in terms of total annual value. In 1955, the Philippines produced 419,112 oz. of gold valued at 43,860,071 pesos. It is significant, however, that though production was slightly higher, the value was lower than that of the previous year's output of 416,052 oz., which realized 44,808,800 pesos.

The director of the Philippines Bureau of Mines notes in his annual report that during 1955 the mining industry was dominated by three major developments: rapid expansion of the nation's copper production, positive steps towards exploitation of the immense nickel resources of the islands, and heightened activity in exploration for petroleum.

The increasingly successful efforts to tap the immense mineral wealth latent in the Philippines are regarded as particularly gratifying in view of the country's economic situation. Hitherto the Philippines has been predominantly dependent upon a few agricultural exports such as sugar, coconut, hemp, lumber and pineapples. The expansion of the mining industry will provide a sound basis for the policy of industrialization by which the Government is seeking to redress the present unfavourable balance of trade, relieve unemployment, and raise standards of living throughout the islands.

Research that promises to establish a new metal industry in the Philippines and may provide the free world with up to a million tons of nickel has been described by the U.S. Bureau of Mines. With funds supplied by the International Co-operation Administration, metallurgists at Albany are running pilot-plant tests to obtain design and cost information for a commercial installation that would produce high-grade ferronickel from Philippine ores. Earlier studies have shown that electric smelting of the Philippine nickel-bearing ores is technically feasible and several firms are interested in developing the deposits, providing a commercial-scale plant can be designed.

An unusual feature of the tests is the use of bagasse as a reducing agent to separate the nickel and iron from the ore. Bagasse, which is the crushed stalks of sugar cane after the juice has been extracted, will be tested on a pilot scale along with any other reducing materials that appear promising. Since bagasse is largely a waste product at Philippine sugar mills, it could be obtained cheaply. This prospect, together with the potential availability of low-cost hydro-electric power in the islands, enhances the possibility of setting up a ferronickel industry.

Australia

(From Our Own Correspondent)

Melbourne, June 30.

There is a very large demand in Australia for sulphuric acid, mainly for the manufacture of superphosphate, and this demand is increasing year by year. Sulphur requirements have been met by importation of brimstone and from the roasting of zinc and copper concentrates, supplemented by the use of pyrite by-product concentrate obtained in the course of copper concentration at Mount Lyell, Tasmania, and Mount Morgan. The urgent demand for sulphur caused Norseman Gold Mines, Western Australia, to change over from gold to pyrite mining, and this company produces some 30,000 tons of sulphur, in pyrite, per year.

The latest pyrite mining company to come into production is Nairne Pyrites Ltd., situated at Brukunga, 3½ miles from Nairne, South Australia, in the hills close to Adelaide. Three South Australian fertilizer manufacturing companies, The Broken Hill Proprietary Co., and the South Australian Government are associated in the undertaking. The South Australian demand for superphosphate is 150,000 tons per year, and of the 50,000 tons of sulphur required, Nairne Pyrites Ltd. will supply 30,000 tons. Concentrate assays 40 per cent sulphur and is railed to acid manufacturers. The deposit extends for 3 miles and is 300 ft. average width, with a steep east dip. The sulphides are pyrite, pyrrhotite and marcasite, with traces of arsenopyrite, chalcopyrite and sphalerite, in finely bedded mudstone. The pyrite occurs in prominent bands following the foliation of the country. Drilling over a length of one mile has, so far, proved 50,000,000 tons of ore.

Ore is mined by open cut, using a 4 cu. yd. Ruston Bucyrus shovel and 20 ton end-dump trucks for transport to the crushing plant. This plant consists of a 60 in. by 40 in. primary crusher and 4 ft. Traylor gyratory crushers, set at 2 in. The screened product goes to Symons 4 ft. tertiary cone crushers and thence to rod mills and ball mills. The flotation section, which follows, consists of three banks of No. 21 Denver cells, each bank being of 8 cells, two rougher cells and the balance cleaner cells. Concentrates are thickened and filtered on an 8½ ft. disc filter. The filter cake drops to a conveyor belt discharging to a swivel piler, which delivers into the storage shed. The piler unit pivots about a vertical shaft to give comparatively large storage with limited headroom. Expenditure on the enterprise approximates £A1,500,000.

COPPER REFINING

Plans for additional copper refining capacity have now progressed to the formation of Copper Refineries Pty. Ltd., an off-shoot of Mount Isa Mines Ltd. which will erect an electrolytic refinery at Townsville, Queensland. The plant will have an initial capacity of 30,000 tons of copper and the new company will contract with Mount Isa Mines Ltd. for the refining of its blister copper.

TASMANIAN MINERAL EXPLORATION

It has been announced that Mount Lyell Mining and Railway Co. Ltd. and Electrolytic Zinc Co. of Australasia Ltd. are to be associated with Rio Tinto (Australia) Explorations Ltd. in a large-scale investigation of the West and North-west Coast mineral bearing areas, in which airborne prospecting techniques will be employed. Certain of these techniques are described on page 86 of this issue.

Portugal

(From Our Own Correspondent)

Foz Do Douro, July 12.

During the last 12 months there has been a pronounced *volte-face* in Portuguese mining affairs. Four years ago exports were virtually limited to normal grade concentrates, tin foundry slags and WO_3 and Mixed WO_3/Sn residues. The imposition by consuming countries of heavier returning charges and stricter allowable maximums for impurities completely changed the old order, causing exporters to give greater attention to the long-known fact that material hitherto treated abroad could be dealt with on a far more economic basis in Portugal.

INCREASING PRODUCTION OF FERRO-TUNGSTEN

The immediate result of this new train of thought has been that ferro-tungsten is being produced in the country and exported on an increasing scale. The first exporter of this alloy was Portugal's second largest wolfram mine, or rather group of mines. Other exporters are now getting ready to follow this example. Plans are already made for the manufacture of synthetic scheelite and other hard alloys. It is rumoured that tin slags will be treated here for the recovery by electrolysis of the metal content. The recovery of payable values from WO_3 and Mixed WO_3/Sn residues is the object of a company already formed.

Tungsten carbide of good quality is now made in Portugal instead of being imported. The local market is still small, but new industries are springing up which will have a use for a product hitherto bought elsewhere.

MINING GAINS IN STATURE

Portugal is becoming mineral-minded, having lost its inferiority-complex regarding the possibilities of anything made locally being able to compete with foreign products. The government is rendering every possible assistance to all new industries, provided always that no wild cat schemes are presented for approval.

Portugal is a producing country and also a country where labour is cheap in comparison with known consuming countries. While some consuming countries levy heavy import duties on manufactured and semi-manufactured materials, a careful comparison between costs of production and import duties in some consuming countries shows that in not every case would the rate of duty preclude the importation of some of the goods which will shortly be locally produced.

As already mentioned in *The Mining Journal*, the final site to be chosen for the erection of the Companhia Siderugica de Portugal's plant for the production of iron and steel caused an unusual amount of paper to be wasted over the publication of the widely varying opinions held by the north and the south. Finally the State intervened by deciding that the site was to be in the north, at any rate as far as the initial reduction of the ore to the metal was concerned. Once again common sense has prevailed.

A shipment of 20 tons of wolframite has been made to Japan. Tentative enquiries from that country are coming to hand.

There is little else to report beyond a mild interest in wolfram ores and a still milder interest in wolfram residues and tantalite/columbite, provided that, in the case of the latter, the Cb205 content is low, a rare thing in Portuguese ore.

The Alkali Metals

The alkali metals include sodium, potassium, lithium, and the rarer caesium and rubidium. Their manufacture and availability were discussed by Marshall Sittig, of the Ethyl Corporation, in a paper given at a symposium on liquid metals held by the American Institute of Chemical Engineers, from which the following article is condensed by permission of *Chemical Engineering Progress*.

Sodium, lithium and potassium are the alkali metals of greatest commercial importance, in that order. Rubidium and caesium are sold only in gram quantities at the present time. However, caesium in particular, as the most reactive of the alkali metals, shows interesting research possibilities and may well become increasingly important.

Whereas the alkaline metals were first discovered as a result of the electrolysis of their molten salts, early manufacturing processes were based primarily on thermal reduction. Then, in the case of sodium and lithium at least, manufacturing swung over entirely to electrolytic methods. Now, increased research emphasis is being placed on thermochemical reduction of a salt (usually the carbonate and sometimes the halide).

Manufacturing facilities for the various alkali metals are heavily concentrated in the U.S., which has about 85 per cent of world sodium production capacity and probably similar percentages of potassium and lithium capacity.

The availability of each of the alkali metals is adequate to meet present demands. This applies both to the known reserves of ores and to the extent of manufacturing facilities. On the other hand, steadily increasing demands for each of these metals calls for expansion of both known reserves and manufacturing facilities.

LITHIUM METAL

In contrast to sodium and potassium (which are found in nature as relatively pure chloride salts) lithium offers a real problem in extraction from its ores. These ores are low in concentration (generally less than 10 per cent Li_2O equivalent) and the deposits are widely separated geographically. The four most important ores of lithium are spodumene, lepidolite and petalite (all silicates) and amblygonite (a phosphate). These are all found in pegmatite deposits, which, according to Norton and Schlegel,[1] must contain one per cent Li_2O in order to be mined profitably.[1] Another important lithium source is dilithium sodium phosphate, which is recovered from California brines. In contrast to the ores, which run from 2-9 per cent Li_2O, these brines may run from 19-21 Li_2O.

MINERALS RECOVERY

The lithium minerals are recovered by either froth flotation, sink-float separation or hand picking, followed by roasting with either an alkali or an acid. The resulting lithium salt is dissolved in water and precipitated or reacted with other materials to form various lithium compounds. A new chloride volatilization process for the recovery of lithium from pegmatite has been described.[2] It involves roasting spodumene with calcium chloride at 1,500-1,900 deg. F. yielding lithium chloride.

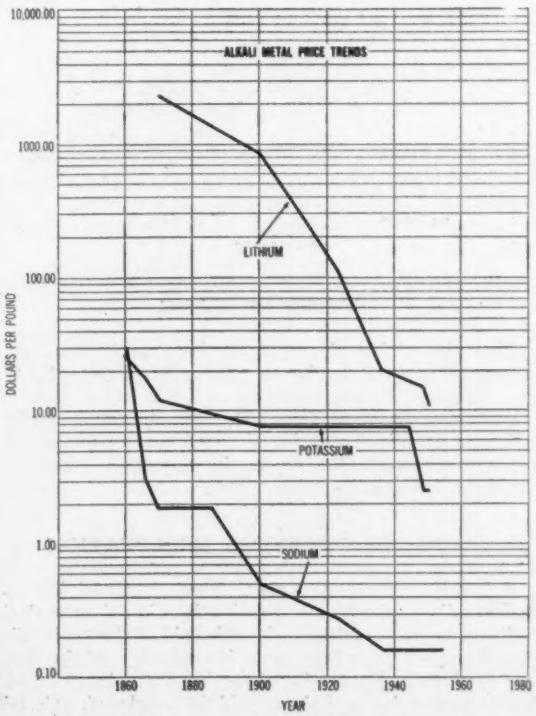
Lithium metal is produced by the electrolysis of lithium chloride. The metal may be purified by remelting, whereupon most of the impurities either sink of float. The preparation of extremely pure lithium by distillation has been described.[3] Lithium metal is apparently being produced by four U.S. companies: American Potash and Chemical Co.; Foote Mineral Co.; Lithium Corporation of America; and the Maywood Chemical Corporation. Maximum lithium metal capacity in 1955, with three of the four major producers supplying, was estimated to be in the region of 200 s.tons.

About 95 per cent of the world's production of metallic sodium is made by the electrolysis of molten sodium chloride in Downs cells and the balance by electrolysis of caustic by the Castner process. World production is estimated at about 150,000 s.tons annually, of which about 130,000 tons is produced in the U.S. The three largest U.S. producers, in order of size, are the Ethyl Corporation, E.I. du Pont de Nemours and Co., and National Distillers Products Corporation. European sodium producers include Imperial Chemical Industry and the Deutsche Gold and Silber Scheideanstalt (Degussa).

Potassium is produced in the U.S. only by Callery Chemical Co., a subsidiary company of Mine Safety Appliances Company. Thorpe[4] stated in 1950 that "there is no industrial demand for potassium to-day and no manufacturing process on any appreciable scale is known to be operating". He went on to say that there was interest in potassium as a reducing agent for other metal chlorides in the 1800's, but cheap sodium had destroyed demand.

Potassium is nearly as abundant as sodium in the earth's crust and is the seventh most abundant element. Among the world's most important deposits are those at Stassfurt, in Germany, which consist of both silvite and carnallite. In the U.S. deposits containing these minerals are located at Searles Lake, California, and at Carlsbad, New Mexico.

Future trends for the alkali metals are all upward, particularly in the cases of sodium and lithium. The situation as regards lithium has been summarized as follows by Arundale. "The outlook is for new and expanded uses for lithium minerals. The problems include the need for deter-



Price trends of the Alkali metals

mining requirements and evaluating market potential, reducing costs, more efficient recovery, development of new uses, and additional information on reserves."

The low price of sodium, combined with the increased knowledge of sodium handling techniques available as a result of atomic energy work, have made this a very attractive metal to industry. This has resulted in the changeover of the titanium industry from magnesium to sodium as the preferred reducing agent.

Potassium uses continue to grow slowly, with emphasis on the low-melting sodium-potassium alloy.

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Mining Graphite in Kenya

Through the enterprise of a commercial organization at Thika, Kenya has gained a firm footing in the highly specialized world market for graphite. The firm in question is Shar Vershi Devshi and Co. Ltd., which for many years has been prominently associated with the development of Thika and now has a wide range of interests in commerce, industry, mining and real estate. Its mine at Kanziku, near Kitui, is currently producing graphite at an average rate of 80-100 tons monthly and exporting it to America, Britain, the Continent and India. Prices range from £25 to £85 a ton according to quality.

The Kanziku deposit contains graphite in veins or bands or rock alternating with limestone bands. It has been known for some time, but was not commercially exploited until 1940, when claims were pegged by Shah Vershi Devshi in 1950. The area was prospected in 1951 by the company's managing director, Mr. D. M. Shah. A geophysical survey showed the deposit to be 3,000 ft. long and roughly 100 ft. deep. The ore reserve was estimated to be 100,000 tons, averaging 10 per cent on the surface but improving with depth.

In October, 1951, a full investigation was started in the Mines and Geological Department, Mineral Research Laboratory, by Mr. A. P. Inamdar, who studied methods of processing the ore. After basic treatment lay-out had been determined in the laboratory, the results were translated into a small pilot plant, which was in operation by August, 1952.

INITIAL DIFFICULTIES OF OPERATION

Formidable difficulties were presented in the early stages, among the major handicaps being shortage of water, distance from the nearest centres, bad roads, the absence of postal communications, and the emergency conditions. Nairobi and the head office at Thika were 145 miles away and the nearest Post Office 40 miles away. For its labour requirements the company was dependent on the untrained and migratory resources of the reserve areas.

These obstacles were overcome and by October, 1954, the pilot plant had been enlarged to produce 50-60 tons a month of various grades. The main flotation treatment and refining plants are now situated 10 miles away, close to an underground river capable of supplying approximately 6,000-8,000 gal. of water per hour even during the driest period. A private telecommunications system maintains daily contact with head office, Thika. The roads have been greatly improved and are open throughout the year. Labour has been trained and has become less migratory, while the emergency is believed to be approaching its end. There are workshops capable of carrying out most repairs, other than very heavy ones, on the site.

The mine employs eight Asians and 250 Africans, owns buildings worth about £4,000, and is equipped with machinery worth between £15,000 and £20,000, including three jaw crushers, five crushing rollers, eight ore screens, 16 flotation cells, two dryers, 14 vibrating screens for the final graphite concentrate, and six engines to drive the plant.

THE MINING METHOD

The method of mining is opencast diggings to an average depth of 3 to 5 ft. Selective drilling and blasting ensures minimum damage to the flakes. The ore mined from the opencast workings is first passed through jaw crushers and then through roller crushers; after the fine screening a rough concentrate is obtained by flotation in five parallel cells. The concentrate is refloated in a set of six flotation cells arranged in series on the crossflow principle. The reagent used in flotation is imported from Germany and it is claimed that the recovery of graphite ranks among the highest in the world. Water for the flotation process is drawn from a borehole.

After drying, polishing and screening, the different grades are blended for the market. The carbon content of the various grades marketed ranges from 97-98 per cent for lubricants down to 65-70 for less exacting applications.

It proved no easy matter to find an entry into the graphite market. World production tends to be slightly greater than demand and buyers are consequently in a position to maintain exacting standards, based on high-grade materials from Madagascar and Ceylon. However, the fact that expansion of production at Kanziku is under consideration indicates that East African graphite has become firmly established in the world market and is in growing demand.

POSSIBILITIES OF FUTURE DEVELOPMENT

The plant is at present producing to the limit of its existing capacity. Now that all the major problems have been solved and the flows of materials determined, consideration is being given to the re-organization of the entire plant for the economical production of some 200 tons monthly of the required grades. In order to eliminate variations in efficiency of the labour force, it is proposed to rely to the fullest possible extent on automation.

Application has been made for an exclusive prospecting licence covering an extensive area, 80 sq. miles of which has already been thoroughly prospected and is known to contain large tonnages of flake graphite averaging 15-18 per cent and in some places 35-40 per cent.

The mine is at present being operated by Shah Vershi Devshi as an associate company which, when it has expanded sufficiently, will be taken over by the Graphite Manufacturing Co., Ltd., whose directors are Messrs. V. M., D. H., M. M. and D. M. Shar.

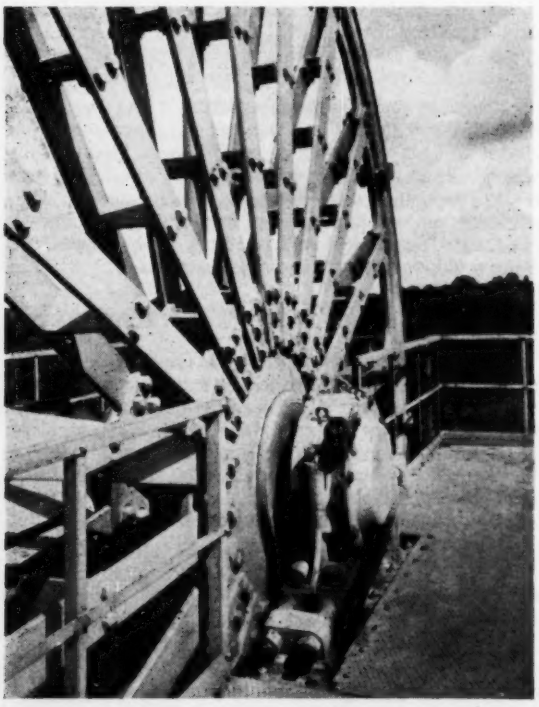
Bearings in Haulage and Ventilation Equipment in the Mining Industry

The application of bearings manufactured by SKF in mine hoists, ventilation fans and mine locomotives are discussed in the following article which concludes with a description of the use of bearings in mine trucks.

Experience has shown that important advantages are gained by the use of spherical roller bearings on mine hoist sheaves. Reliability in service is, of course, the first consideration. Roller bearings do not run hot or seize up, which can happen with plain bearings, because of their inability to adjust themselves to deflection of the headgear, or owing to the fact that the lubricant changes its viscosity with temperature variations. Other important advantages are reduced maintenance, saving in lubricants and power, and the fact that roller bearings take up less space axially than plain bearings.

A mine hoist sheave with spherical roller bearings, in service with a Belgian mining company, Charbonnage de Mariemont-Bascoup, has a dia. of 24 ft. 6 in. and weighs 18½ tons. The bearings are mounted on withdrawal sleeves, and the journal dia. is 320 mm. A special grease duct leads to each seal so that the labyrinths can be kept charged with grease.

The use of grease for roller bearings simplifies lubrication and makes for greater cleanliness. Furthermore, the grease itself, together with careful design of the housing seals, affords protection of the bearings from water and moisture, as well as from any smoke deposits from chimneys in the vicinity.



24 ft. 6 in. dia. mine-hoist sheave fitted with SKF roller bearings in service with the Belgian mining company Charbonnage de Mariemont-Bascoup

Close-up of a guide gear fitted with the manufacturers' bearings used for cage in a gold mine in South Africa

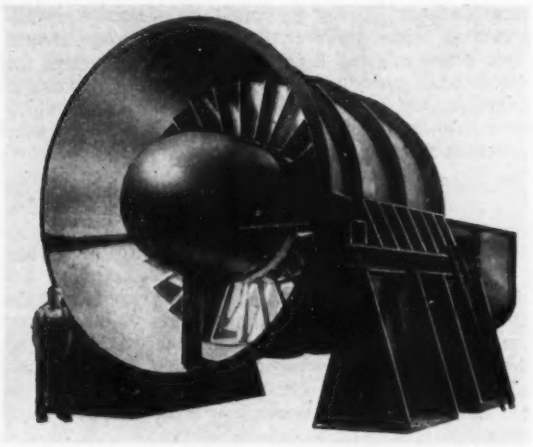
In view of the high operating speeds of modern hoisting gear, it is essential that mine cages should be well guided and that friction in the guide gear should be kept to a minimum. The conventional slipper guides for mine hoist cages have caused a great deal of trouble owing to rapid wear of the guides. Cages are therefore being equipped with special guide rollers, consisting of pneumatic-tyred wheels, each of which is fitted with a double row of angular contact ball bearing. Tests carried out with these wheels have given most satisfactory results. Twelve guide rollers per cage were required in the case of a three-decker man-cage, which might be described as a typical example of this application. Each wheel is secured to the framework of the cage by means of an eccentric journal, thus facilitating accurate adjustment relative to the guide.

MINE VENTILATION FANS

Mine ventilation fans must be capable of operating for indefinite periods with minimum stoppages for maintenance and repairs. Yet a fan, like any other machine, is only as reliable as its bearings.

As an example of the part played by bearings in this exacting field, may be cited a mine fan installation for the National Coal Board carried out by Thermotank Ltd. of Glasgow. This comprises two 140 in. dia. 3-stage Thermotank torpedo fans operating in parallel.

The fan is arranged for exhausting from the mine. The drift involved is initially a single one, but at a certain distance from the upcast shaft it divides into two drifts, each of which serves one fan unit. Suitable isolating dampers are fitted at the drift bifurcation to ensure that no recirculation of air takes place when one fan only is in operation.



One of the 140 in. dia. 3-stage Thermotank torpedo fans in course of erection

A cardan shaft, supported by suitable flexible couplings, carries the drive into the motor house where a 475 h.p. motor running at 750 r.p.m. drives the fan through V-ropes.

All the bearings are SKF spherical roller bearings arranged for grease lubrication. The main shaft bearing is located at the inlet end of the fan and carries the combined radial and axial load due to the air thrust.

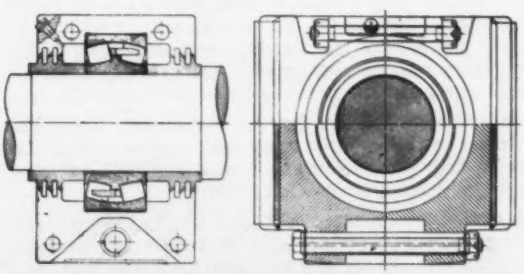
These fans were installed in 1950, one unit running alternately to the other for a short period before development of the mine reached a stage where the full combined output from both units was required. The present duty of the installation is 700,000 cu. ft. of air per min. at 6 in. water gauge with each fan running at 355 r.p.m.

Since the completion of the installation it is estimated that each fan has completed upwards of 900,000,000 revolutions and this fact emphasizes the reliability of the bearings, particularly when it is appreciated that the fans run continuously night and day.

MINE LOCOMOTIVES

Low starting friction and low maintenance costs are among the foremost considerations when designing the bearing arrangements for mine locomotives. Special problems are often presented by the overriding necessity for dimensioning such locomotives with respect to the space available in the tunnels.

One particular locomotive manufactured by the Hunslet Engine Company Ltd., of Leeds, has been designed for North American collieries, where it is the custom to cut only the coal seam. The height of transportation units must therefore be kept extremely low, although a comparatively large width is permissible. The overall height of the unit under notice is only 3 ft. 3 in., but the width and length are respectively 7 ft. and 18 ft. A horizontal type of oil engine drives through a friction clutch and four-speed gearbox. A jackshaft carries the final drive and flycranks, and there is a rod drive to the wheels.

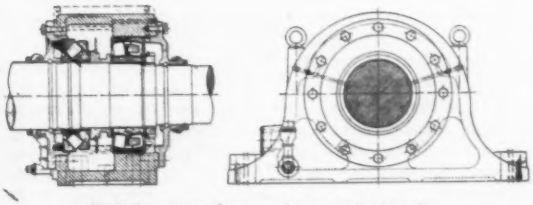


Spherical roller ball bearing axlebox for mine locomotive

The jackshaft is carried by two spherical roller bearings taking the loads from the flycranks and the gear loads are taken by two cylindrical roller bearings. The spherical roller bearings are lubricated with grease, while the cylindrical roller bearings are splashed with oil from the gears. The driving axles are carried in vertically split axleboxes between wheels and cranks, each box containing one spherical roller bearing. The boxes are provided with welded-on, manganese steel liners and are lubricated with grease.

MINE TRUCKS

Trucks are extensively used for the transportation of vast tonnages of materials in mining and quarrying operations and close attention is therefore given to the design of mine trucks, particularly to the wheels and bearings. As a result of this attention, wheel sets and bearings have undergone considerable changes. The original plain bearings were superseded in the first place by a succession of improved designs, which were eventually replaced first by cage-and-roller assemblies with either solid or flexible rollers, and finally by the anti-friction bearings of the present day. Throughout these developments, however, the traditional design with the axle rotating together with the wheels was retained, its abandonment in favour of stationary axles and independently rotating wheels being of more recent origin.



SKF bearings for a mine ventilating fan

The life of wheel sets with wheels rotating on stationary axles was found to be appreciably longer than that of any other designs tested. Some tests results are reproduced in the table below by courtesy of S.K.F. and these findings have been amply confirmed by practical experience in all parts of the world. It was found also that taper roller bearings were the type of bearing best suited for use in free wheels.

TEST RESULTS

Design of wheel set	*Type of bearing*	*Load per axle lb.*	*Mileage*	*Power consumption as checked on a Prony brake, watts*
Wheel sets with rotating axles	1. Plain bearings	1,135	7,021	745
	2. Solid roller assemblies	1,135	16,277	332
	3. Flexible roller assemblies	1,135	28,505	170
	4. Taper roller bearings	1,135	46,614	66
Wheel set with wheels rotating on stationary axle	5. Taper roller bearings	1,135	46,607	52
		2,205	39,153	
	Total		85,760	

The tests with wheel sets 1 to 3 had to be stopped on account of bearing failure when the mileage recorded had been reached. On the other hand, the taper roller bearings

of wheel set No. 4 were found to be still in good condition at the end of the run. The test report states that after covering 46,607 miles under an axle load of 1,135 lb., set No. 5 was given a further run of 39,153 miles with an axle load of 2,205 lb. On being examined at the end of the second run its bearings were found to be still in good running order. It should be noted that the power consumption of this wheel set was less than 80 per cent of that of the best of the other sets.

One of the principal reasons for the superiority of free wheel designs is that each wheel can rotate at the required speed, and sets are consequently less subject to wear and to the formation of flats on tread or flange than wheels rigidly attached to the axle. A second reason is afforded by the robustly designed bearings and axles fitted on mine trucks of the present day.

When using wheel sets with rotating axles and cage-and-roller assemblies, it is necessary to renew the lubricant every month in order to keep the running resistance within reasonable limits. Under the conditions of service prevailing in most mines, however, the lubrication requirements of free wheel sets and bearings are met by renewing the lubricant once in two years. The work of maintenance is further lightened by the accessibility of the bearings, which enables them to be inspected with ease and rapidity on the rare occasions when inspection is necessary.

The saving represented by an increase in the number of trucks available for immediate use may be added to economies in lubrication and maintenance, since the percentage of trucks withdrawn from service at any given time for lubrication purposes is greatly reduced. Another advantage is that the small amount of space required by the axle enables the truck body to be made slightly deeper when sets with wheels rotating on stationary axles are employed. It follows that the capacity of the truck is increased while the overall dimensions remain unchanged, and in some mines increases of as much as 8 per cent have been reported.

Old Mining Claims Surveyed by Helicopter

Neglected copper mining claims staked out half a century ago by prospectors working on foot through the mountains of Western Tasmania have been sought out and surveyed by a Bristol Sycamore helicopter of Australian National Airways. This is one of a wide variety of tasks undertaken by the Sycamore, the first helicopter to enter commercial work in Australia, during recent charter operations in Western Tasmania, an area still largely unmapped.

The old mining claims were located by the Sycamore for the Mount Lyell Mining and Railway Company. The company was following up the stories of old prospectors about strikes they had made many years ago, and the Sycamore's job was to fly surveyors over the old claims to determine whether there was a rich enough mineral lode to be worth exploitation. They were aided in their search by the use of a scintillometer. The country over which the Sycamore was operating is completely without roads and railways, with thick forests and mountains rising to perhaps 4,000 or 5,000 ft.

ANA's Sycamore also carried out operations for the Tasmanian Hydro Electric Commission, for which Sycamores of the Royal Australian Navy last year carried out a number of survey and supply flights. Operating with a school playground as base, the helicopter took hydro-electric commission surveyors into the interior to make preliminary investigations of possible dam sites, landing on shingle beds at the sides of rivers, on tops of mountains, or on patches of button grass. On some flights, the aircraft carried Government surveyors who are mapping the area in detail.

Aerial photograph of the Mount Lyell workings taken from the Bristol Sycamore

The Bristol Sycamore after landing on a shingle bed in Western Tasmania

The Sycamore, which averaged five or six hours' operation a day, also delivered telegraph poles and insulators to the hydro-electric commission's grid lines, running across bush country. The telegraph poles were 12 ft. in length and weighed about 100 lb. apiece; they were carried athwart the fuselage of the Sycamore, and some six or seven poles were carried on each flight and set down beside the grid pylons.

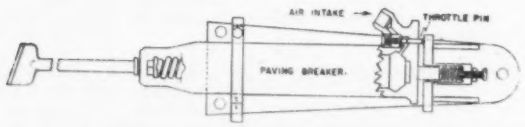
On another operation for the commission, the Bristol helicopter carried into the mountains a prefabricated hut, with log floor and insulated galvanized iron walls and roof, for use of a construction crew.

A demonstration was undertaken for the Mount Lyell mining company, in which part of a mine railway truck was lifted from the top of a hill and set down some distance away..

Machinery and Equipment

Tests With New Phosphate Rock Planer

A new type of continuous mining machine that promises to reduce operating costs of underground phosphate rock mines in the Western United States has been described in a report from the U.S. Bureau of Mines. Called a planer, the machine was designed and built at the Bureau's Spokane field office. Bureau engineers have been testing it for more than two years, under a co-operative agreement, at the Anderson Mine of the Montana Phosphate Products Co.



The carriage cradle with paving breaker chisel mounted

Lighter and less bulky than a coal planer, the phosphate planer is adaptable to mining tabular deposits ranging from horizontal to vertical. It consists essentially of a welded steel carriage, supporting a vertical bank of pneumatic chisels that chip out ore as the machine is pulled along by a cable. The planer has four pneumatic-tyred wheels which are turned to force it against the mining face as it moves, and the carriage is shaped to pick up broken material and plough it away from the face. Although most western phosphate-rock production now comes from open-pit mines, estimates of the Federal Geological Survey show that 95 per cent of the reserves will require underground mining.

Among the advantages of planer mining in underground operations, as indicated by the Bureau's tests are: increased productivity; greater overall recovery; and elimination of blasting, which means less dilution of ore with waste rock and, under certain conditions, fewer supporting pillars. Although the planer has only been tried in phosphate rock it has a potential use in many other types of ore deposits.

Density Gauging in the Mining Industry

An Isotope Products Density Gammagage will shortly be installed to control density in an application for the mining industry, namely the concentration of iron ore at one of the Lake Superior mines, Canada. The ores are treated by a sink-float process. A so-called "heavy media" is used, the density of which is accurately adjusted so that it lies between the density of ore and the density of gangue rock. So when the ore is fed into the heavy media the iron-bearing part will sink, the gangue will float.

The density of this heavy media, which is a suspension of ferrosilicon in water, is now to be kept constant by radioactive gauging, using the gammagage. This represents one in a series of applications of this radioactive gauge to the mining industry. Already it is in use to control slurry density in thickeners, to measure uranium concentration, to control grinding circuits and the feeds to floatation cells.

Rotary Vacuum Filters

The design and general construction of the Paxman rotary vacuum filter manufactured by Davey, Paxman and Co. Ltd., is based on experience of chemical, metallurgical and general filtration processes. For the normal requirements of varied industries, Paxman filters with cast iron or steel drums are manufactured in standard sizes, each constructed to meet specific requirements.

The rotary vacuum filter consists of a drum divided into a number of vacuum and pressure tight cells. The drum is arranged to rotate partly submerged in the slurry to be filtered and speed of rotation is variable according to the material filtered.

The filters are described in an interesting brochure recently released by the manufacturers.

Reviews

A Handbook on Belt Conveyor Design. *The latest addition to a series of technical handbooks published by The General Electric Co. Ltd., Fraser and Chalmers Engineering Works. Pp. 147. Price 30s.*

As implied in the title, this book is primarily devoted to belt conveyor design, but perhaps a little more attention could have been given to the application of belt conveyors. Variations of straightforward conveyor belts, such as conveyor type feeders, trippers, etc., are dealt with in detail and a feature of great value to design offices is a chapter on Fundamental Analyses of Conveyors.

The various secions are linked together by a sample calculation clearly illustrating how the problem of designing a belt for a particular installation is tackled by the manufacturer. However, in dealing with such a comprehensive subject in 147 pages it is inevitable that omissions are made: for example, the section on Weightometers is inadequately dealt with in half a page without any illustration. Similarly, other sections suffer from a degree of inadequacy which detracts from the value of the book to students.

There are 50 pages of tables included in the book, dealing with capacity, horse-power, drum diameter, etc., which will be of use to anyone contemplating a conveyor installation. Unfortunately, an index is not provided for these tables which militates against easy reference when employing the charts and tables to simplify individual calculations.

Despite these omissions *A Handbook on Belt Conveyor Design* is a very useful publication, especially for engineers specializing in this subject, and whilst not unique as a reference work the 50 years of design experience embodied in the text ensures its authority.

Peaceful Uses of Atomic Energy. *Vol. 2: Physics, Research Reactors. Pp. 471. Price U.S. $8.00, 57/-, 34.00 Sw. fr. Vol. 4: Cross-Sections Important to Reactor Design. Pp. 357. Price U.S. $7.50, 54/-, 32.00 Sw. fr. Vol 6: Geology of Uranium and Thorium. Pp. 825. Price U.S. $9.00 63/-, 39.00 Sw. fr. Available from H.M. Stationery Office, P.O. Box 569, London, S.E.1 (and at H.M.S.O. shops at London, Belfast, Birmingham, Bristol, Cardiff, Edinburgh and Manchester.)*

These three volumes are part of the English-language edition of the "Proceedings of the International Conference on the Peaceful Uses of Atomic Energy." A total of 16 volumes of the Proceedings is being issued, containing all the papers and verbatim records of the Conference held at Geneva in August, 1955. This publication provides for the first time a complete reference work on all the peaceful uses of atomic energy and is likely to remain the standard text and basic documentation on the subject for many years to come.

Virtually every country presented at the Geneva Conference a summary of its own resources and prospects for uranium and thorium discovery. These contributions are covered in full by Vol. 6, which also includes discussions of prospecting techniques.

The Geology and Mica Deposits of the Harts Range, Central Australia, *by Dr. G. F. Joklik. Obtainable from the Bureau of Mineral Resources, Melbourne and Canberra, Australia.*

Although the Harts Range mica field is among the largest in the world, Australian production is only an approximate 30 tons per annum in a total world production of about 10,000 tons. In the past it has not been possible to assess the mica resources of the Harts Range because of insufficient knowledge of the widely separated deposits, and because of the apparently haphazard way in which the mica deposits of the field occur. A detailed study of the Harts Range field and of the existing mines in the area has enabled the Department to forward a number of geological facts which all provide pointers to the location of other deposits, add considerably to existing knowledge, and offer assistance to mine operators in the winning of increased mica supplies.

MINING MISCELLANY

The Nigerian Coal Corporation has announced new all-time records for the monthly and annual production of coal. Production for the 12 months to March, 1956, was just over 750,000 tons—about 70,000 tons more than that for the previous 12 months.

* * *

In a report to the Storting on Norway's mining industry, the Ministry of Industries stated that the Government was satisfied with the way in which privately-owned mines were being worked and could see no reason for the State to take them over.

* * *

Unusually promising deposits of sulphur pyrites containing copper are reported to have been discovered in the Nordli district of North Trondelag, in Norway. They are being thoroughly investigated.

* * *

The Japanese steel industry hopes to import 580,000 tons of coking coal from Communist China during the 12 months beginning August this year. Price is stated to be the most important factor in the proposed deal.

* * *

An American-Canadian expedition has arrived at Godthaab, south-west Greenland, to investigate the possibility of building a port for the trans-shipment of iron ore from Arctic Canada. Two companies, International Iron Ore Ltd., and Atlantic Iron Ore Ltd., are behind this project.

* * *

The Chartered Bank of India, Australia and China has announced that H.M. the Queen has conferred upon it a new and consolidating Royal Charter, which enlarges in certain directions the powers and privileges which have been enjoyed from 1853 onwards.

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Swiss press reports state that the firm of Gautchsi Electro-Fours of Tagerwilen has received a contract from French firms for the construction of the refining and casting section of the large new aluminium refinery in the Cameroons.

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South American Gold and Platinum Co. has received the first concession granted to an American company in Bolivia since the expropriation of foreign mining properties in 1952. The 25-year concessions cover what is believed to be the richest undeveloped placer gold mining area in South America.

* * *

In spite of exceptionally severe weather conditions, shipments of iron ore from Sweden during the first quarter of this year were exceptionally good, thanks to full utilisation of the loading capacity at the port of Narvik. They totalled 3,260,000 tons, an increase of 330,000 tons or 11 per cent over January-March, 1955.

* * *

The National Coal Board has put down four boreholes (the last is nearly completed) to explore the extension of the Canonbie Coalfield, which lies on the boundaries of England and Scotland. Workable reserves of coal have been proved and in due course a colliery may be sunk to work them, but for the present the Board's resources are fully engaged in the exploitation of proved reserves in other coalfields.

* * *

Iron ore deposits, estimated at 1,500,000,000 tons with an iron content of 30 per cent, are being explored north of the Salzgitter works in West Germany. Mining will start next spring. The quality of the ore is described as superior to that found south of Salzgitter, so that processing may prove less costly.

* * *

The Indian Government is considering the establishment of one or two plants for producing machinery for heavy industries, according to Mr. R. T. Krishnamachari, the Indian Minister for Commerce and Industries. He told a press conference that India must produce 66 per cent of her needs within the country before the end of the third five-year plan in 1956. An American firm is to visit India soon to advise on the establishment of an aluminium plant, which will be additional to the 10,000-ton capacity plant already licensed to a private firm.

* * *

Five large mining companies are at present negotiating with the Government of Tanganyika for large prospecting rights. Among them is Consolidated Goldfields of Africa, whose chairman, Mr. Robert Annan, stated that an aerial survey undertaken by the company was giving encouraging results.

The Department of National Development, working in co-operation with the Victorian Department of Mines, has begun a detailed aerial magnetometer survey for iron ore deposits over an area of 300 to 400 sq. miles between Nowa Nowa and Buchan in East Gippsland.

* * *

Coal deposits of between 80,000,000 and 90,000,000 tons have been discovered in the Mecsek mountains and in the Máza area of Hungary. The deposits contain coking and good quality industrial coal. Exploitation is to begin next year. Hungary plans to raise coal production over the next five years by opening up new mines capable of producing 10,000,000 tons.

* * *

It was announced recently by Lord Baillieu, the chairman, that new plant had been installed by Dunlop to meet the continued trend in the change-over from rubber to flameproof anti-static conveyor belting. The new developments are taking place in accordance with the requirements of the N.C.B.

* * *

Revisions in the Ontario Mining Act, pertaining to rules governing the operation of mines, are included in a revised handbook which is now ready for distribution by the Department of Mines. The two principal amendments are concerned with the requirements for shaft linings and the thickness of party walls separating adjacent mines.

* * *

A four-man team of Russian experts has arrived in New Delhi to advise the Indian Government on the manufacture of heavy machinery. The team will study the possibility of setting up a heavy machinery factory in India. A team of British experts, sponsored by the Colombo Plan and the Federation of British Industries, is expected to visit India in the autumn. It will also submit a report on the manufacture of heavy machinery.

* * *

According to figures released by the Mining Chamber, mineral production in Mexico declined during the first three months of 1956. Only copper showed an increase, advancing from 15,491 tonnes produced during the first three months of 1955 to 17,525 tonnes for the same period this year. Production of gold declined from 3,924 kilos to 2,631 kilos, silver from 506,767 kilos to 331,587 kilos, lead from 55,040 tonnes to 49,000 tonnes, and zinc from 83,419 tonnes to 49,377 tonnes.

* * *

During the five years ending in 1961 the British Government will spend £2,250,000 in Swaziland and the Colonial Development Corporation £6,750,000. Sir Percivale Liesching, High Commissioner of Basutoland, Bechuanaland and Swaziland, stated that the cost of new road and rail links in the territory would be offset in part by the exploitation of iron ore and coal deposits and the introduction of hydro-electric power.

* * *

The Geological Survey of Canada will carry out one of the greatest airborne mapping programmes ever attempted this summer in the mountainous areas of British Columbia. The main centre of operations will be an area of 25,000 sq. miles in the Cassiar Mountains and the Stikine Plateau sections in the northern part of the province. Two helicopters and conventional aircraft will be employed. It is expected that seven parties will map in one season as much territory as would have required 30 parties using conventional methods.

* * *

Canada's first commercial helicopter operators, Kenting Helicopters Ltd., of Oshawa, are pioneering in the aerial geophysics field with a lease purchase-option on the first Bristol Sycamore in North America. This helicopter will be used by Kenting on mineral searches for an associate company, Aeromagnetic Surveys Ltd., of Toronto. Equipped with a newly-developed electromagnetometer device, which is suspended below on a cable, it will search for electrically conductive base ore deposits. The equipment also includes a scintillation counter for detecting radioactive ores.

* * *

The full facilities of the Test House of International Combustion Ltd., at Derby, which are now available to industry generally, were open to inspection by members of the Technical Press on Tuesday of this week. Claimed to be the most comprehensive unit of its kind, the Test House is fully equipped, particularly with grinding, screening and filtering equipment suitable for the mining and chemical industries. Several thousand representative samples of materials previously tested

Office and entrance to the plant of International Combustion Ltd., at Derby

were available for inspection and a note describing the test plant will be published in next week's issue.

* * *

Steps are being taken to make better known overseas the unique service offered by the British Plastics Federation in publishing each month abstracts from technical articles in journals throughout the world dealing wholly or partly with plastics developments. The service includes the publishing of patents. It costs £10 10s. a year post free. Photostat or microfilm copies of most articles can also be obtained from the Federation, whose offices are at 47-48 Piccadilly, London, W.1.

* * *

The Atlas Consolidated Mining and Development Corporation has announced plans to establish a combination smelter and refining plant to produce metallic copper from its concentrates. The plant will be installed at Sangi, near Toledo, on the island of Cebu in the Philippines. Nearby, Atlas operates the largest open-pit copper mine in the Orient and the first large-scale base metal works in the Philippines. The new smelter-refinery is expected to result in substantial transportation cost savings. It will be conveniently situated in regard to the new copper fields being developed in the Fisayan Islands.

* * *

The proposed 10,000 tons aluminium plant provided for under India's second five year plan at a cost of Rs.100,000,000 will probably be erected at Mettur in the Salem District of West Madras. A 60-acre plot has been allocated for the plant and sufficient power will be available. Mr. T. T. Krishnamachari, the Indian Minister of Commerce and Industries, has stated that construction of the plant would depend upon the availability of good quality bauxite in the area. Samples from deposits in the Sheavaroys Hills and also in the Salem district will be sent to the U.S. for testing.

* * *

A survey of the Lower Zambesi Valley conducted by the Southern Rhodesia Department of Geological Survey has shown the area to be "well worth investigating for minerals such as asbestos, nickel and platinum." This was disclosed in the report of the Director of Geological Survey, which has been tabled in the Southern Rhodesia Parliament. During 1955 there was great activity in prospecting for base minerals in the Colony. During the year the department made 5,136 rock determinations in Salisbury alone.

* * *

The annual report of the Department of Mines and Technical Surveys, Ottawa, for the year ending 31 March, 1955, refers to heavy demands from the Canadian mineral industry for the solution of the many problems associated with its present rate of growth. Foremost among them were requests for work on the processing of complex ores, including radioactive ores. In addition, defence requirements and those of the Atomic Energy of Canada, Limited, covered a wide field. Numerous economic studies were made of specific phases of Canadian mineral resources and development.

* * *

Westinghouse Electric Company scientists claim to have developed a "super" magnetic material, which promises to revolutionize the use of permanent magnets. The material—manganese-bismuth—is virtually 100 per cent pure. An important advantage is that pure manganese-bismuth is ten times more resistant to de-magnetization than permanent magnets now used, the company states. The new magnetic material can be embedded in plastic and then cut, drilled or shaped in any size or form. A Westinghouse official said magnets could be cast or moulded, possibly even extruded, in any shape desired, eliminating expensive machining operations.

* * *

Bulletin No. 29 of the British Guiana Geological Survey describes the geology of the Issineru-Enachu district, Mazaruni River, British Guiana. This region still remains the main productive area in the Colony for placer diamonds. For many years diamond production has fallen off, but there may be some temporary improvement as the new technique for diving in the main rivers and dredging develops. Gold still remains the second main mineral resource in British Guiana, but if the price of gold should again rise a revival of gold mining, both placer and reef, would be created. Until that eventuality occurs it is unlikely that lode or reef mining will revive to any extent except in the cases of those deposits yielding high values. In most areas placer mining should continue to thrive, but it is considered unlikely that gold dredging of the rivers and streams described in the Bulletin will ever be undertaken.

* * *

Of the several different types of explosives and blasting accessories shown to the Press on their visit to the Nobel Division of I.C.I. at Ardeer, Scotland, referred to in these columns last week, the "Hydrox" device and the Pulsed Infusion Shotfiring technique were particularly interesting. With the "Hydrox" device, gas (a mixture of nitrogen and water vapour) is generated by a chemical composition inside a steel tube until the pressure is sufficient to blow away the head disc, thus releasing the compressed gas suddenly to blast the coal.

Pulsed Infusion Shotfiring is a technique operating on the principle that shock waves are transmitted more effectively through water than through air. To meet the demands of this technique the Nobel Division developed a special permitted explosive which is known as "Hydrobel" and its composition is such that it will reliably propagate under the high hydrostatic pressures involved. In actual practice, the technique is to fire an explosive charge in a borehole filled with water under pressure. The water is introduced through an infusion tube which also seals the hole. When the charge is fired it produces a high pressure impulse in the water which is transmitted into the numerous cleavage planes and slips, and thus breaks the coal. This new method is in regular use at about 15 collieries and some 70,000 shots have been fired.

PERSONAL

Mr. W. M. Warren has been re-elected chairman of the Malayan Chamber of Mines and Mr. E. D. Shearn, vice-chairman.

* * *

At a recent reception in Glasgow Scottish Government officials, major contracting company representatives, Caterpillar dealers and suppliers met Mr. Harmon S. Eberhard, president of the Caterpillar Tractor Co., Peoria, Illinois. With Mr. Eberhard was Mr. J. R. Munro, Caterpillar's director of manufacturing foreign operations and Mr. W. J. Bornholdt, managing director of the Caterpillar Tractor Co., Ltd., Desford, Leicester. Mr. Bornholdt will take over the new tractor manufacturing plant at Tannochside when completed in 1958.

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The Catalogue Survey and Directory Number of *The Mining World*, published on April 16, 1956, presents a comprehensive picture of developments in the mining and metal industries during 1955.

* * *

Plans for the programme for the 1956 Metal Mining and Industrial Minerals Convention and Exposition of the American Mining Congress have been drafted by a committee of mining industry officials which met recently in Los Angeles. The convention will be held on October 1-4 in the Shrine Exposition Hall, Los Angeles.

CONTRACTS AND TENDERS

The following future authorizations have been announced by the International Co-operation Administration (I.C.A.):

	Contract Period	*Terminal Delivery Date*	*Amount (in U.S. dollars)*
Bolivia			
Construction, mining and conveying equipment (PA No. 11-740-99-A1-6247)	18/6/56-31/12/56	31/12/57	251,900
Misc. Industrial non-ferrous metals and their products (PA No.11-698-99-A1-6258)	18/6/56-31/12/56	30/6/57	5,000
Taiwan (Formosa)			
Equipment for coal mine improvement project (PIO No. 84-21-007-9-60330)	5/6/56-30/11/56	30/6/57	100,000

B.O.T. Ref. ESB/17849/56/ICA. Telephone enquiries to Chancery 4411, extension 360.

* * *

Whatlings, the Glasgow civil engineering contractors, have received a £2,000,000 contract for preliminary work at the N.C.B. opencast site at Westfield, Fife.

METALS, MINERALS AND ALLOYS

COPPER.—The main task of the copper market in the United States in the past week has been to digest the consequences of the reduction in the quotation of the primary producers to 40 c. As reported last week, the immediate consequence was to cause a hardening of values; the price on the L.M.E. advanced, the Belgian and Canadian producers raised their prices to nearer the American level and the American custom smelters put another ¼ c. on their price to bring it to 38 c. per lb. for immediate delivery. It has also been confirmed in Santiago that Chilean metal will only fetch 40 c. from now on in the United States. What has not been decided is where the market goes next.

Copper has been quiet in the past week and demand has been soft. Foreign copper has been on offer by the dealers at under 37 c. and has not had a very encouraging response. No. 2 scrap copper has been weak at 31½ c. The weakness in demand is largely explained by the incidence of annual vacations and the shutdowns are in full swing.

But there is also the reluctance of buyers to commit themselves while the prospect of still cheaper copper exists. This prospect must look very real now that the industry is to be free from strikes for three years. Everything now seems to depend on how much longer the consumers can live on their stocks, buying only what they must. To answer this, one must know when and how far the American automobile industry will pick up. *Wall St. Journal* suggests that new bookings in the brass mills in the second quarter were as much as 40 per cent below the high level of the first quarter but that the low point has been passed and that bookings are now running at about 10 - 15 per cent above the year's low rate. The wire mills have also seen a fair reduction in their business. The answer to the puzzle probably is that the custom smelters will now resume the role they had at the beginning of the downturn, of feeling the way. In the past few weeks it has been the scrap price that has been the truest indicator of American demand; it now seems that the custom smelters will take over this role and it is quite likely that there will gradually grow a renewed spread in the American price structure till the big producers can bring themselves to make another reduction.

Meanwhile, the African Mineworkers' Union has issued a memorandum on its complaints against the Chamber of Mines. When the Chamber and Union met at Kitwe to discuss the recent crop of strikes it made no progress. The Union then asked for an adjournment while it produced a memorandum and asked that, at Nkana, the present system (that is the system whereby the African is allowed some choice as to whether he be paid monthly or on ticket) should continue at least while negotiations continue. The Chamber refused the second request thus emphasizing that in their view the matter has passed the stage of negotiation. The Union then accused the Chamber of being responsible for the recent strikes. It asked for a "more progressive and enlightened policy" and said that the Chamber had "implemented and perpetuated" measures which it said would weaken the African union. It claimed that the policy of deliberately fostering discord among the Africans would hold no good future for the employers or the Africans. For the time being the matter rests, for the Chamber is not bound to take action on the allegations. But if the Union genuinely believes that the Chamber is deliberately trying to weaken the Union then the Union will look for a dispute on which it can count on the support of its members and then stand and fight. The outlook continues unsatisfactory.

LEAD.—Lead has been spotty in New York at 16 c. per lb. Occasionally dealers have had bright news but in the main the market has remained quiet. The metal is still fairly comfortably supported by stockpiling of domestic and foreign metal. It is said, however, that the G.S.A. was offered much more than the 10,000 tons that it would buy at the last month's call. Domestic deliveries of lead in the first half of 1956 were around 369,000 tons against 410,000 in the first half of 1956.

TIN.—Tin has generally ruled firm in the United States in the past week and the quotation for spot straits metal has advanced to over 96 c. per lb. However, there has been no great volume of business done and the interest has come mainly from dealers. While the steel strike persists there can be little hope of any really active buying. The firmness on such a thin market has been largely the consequence of a conviction that the fall, which took place when the Malayan Mining Employees' Union secretary said that the outlook was not so serious, was in fact overdone. Trouble in Malaya persists. It is true that since it is the union that is making it any such comment from the union secretary must be treated with respect, but it is deeds and not words that are required from the union.

Meanwhile, the Legislative Assembly of Malaya has authorized the Finance Ministry to borrow $30,000,000 (Malayan) to finance the Malayan contribution to the buffer stock of the I.T.A. The Thai National Assembly has also passed a Bill to authorize the government to join the I.T.A. and to contribute money instead of tin to the buffer stock.

The Malayan Minister of Natural Resources and Local Government is shortly to tour the Federation with the object of finding new land for tin mining. Mr. Lee, Finance Minister, said that new land must be found if Malaya is to remain the world's largest producer of tin. The United States Interior Committee of the Senate has approved a Bill to allow G.S.A. to buy up to 10,000 tons of tin at prices from $1.20 to $1.35 from domestic sources. The tin will come mainly from Alaska where unemployment is serious. Purchases will be spread over ten years.

ZINC.—Zinc has had another poor week in the United States on the basis of 13.50 c. per lb. for prime western grade East St. Louis. There has been occasional buying by the few steel producers not on strike but the demand for special high grade has been as poor as ever. The arrival of the annual holidays has worsened the gloom temporarily. Meanwhile, although the metal is being heavily stockpiled it is being said that more is being offered to G.S.A. than the G.S.A. will take. It appears to be content with taking around 15,000 tons. It took 15,085 tons in June against 10,196 in May. Producers' stocks at the end of June stood at 70,025 tons, an increase of 10,448 tons on the month.

CAESIUM.—Reports from Toronto state that caesium has been developed to a point where it has proved to be a better radioactive medium than cobalt in the treatment of cancer. Caesium 137, an element sold by the gram, is recovered from nuclear reactor processes as one of the waste products of uranium fuel. In nature it is usually associated with rubidium. This "by product" of atomics has already found many scientific uses such as scintillation counters and in gadgets which enable machine gunners to see in the dark.

PLATINUM.—In view of the high level of demand for the platinum-group metals and the prospect of increasing supplies from South Africa, Canada and doubtless the U.S.S.R., particular interest attaches to the U.S. market report for 1955 which has been released by the Bureau of Mines. Total imports of platinum-group metals into the U.S. last year were 68 per cent greater than in 1954 and total domestic consumption rose 46 per cent. Total imports amounted to 1,009,819 oz. against 601,612 oz. in 1954. They included substantial quantities of platinum and palladium acquired by the Government through exchange of surplus agricultural products.

Total domestic sales of platinum in 1955 were 46 per cent greater than in the preceding year. Due principally to the very heavy requirements of platinum for catalytic use in oil refining, the chemical industry was again the largest user, taking 75 per cent of the total sold. Sales to the electrical industry accounted for 10 per cent and for jewellery 11 per cent.

Total domestic sales of palladium in 1955 were 50 per cent higher than in the previous year, due chiefly to demand for electrical contacts in the expansion of dial telephone systems. Consumption of palladium by uses was as follows: Chemical 11 per cent, electrical 71 per cent, dental and medical 8, jewellery and decorative 8, and miscellaneous 2.

Total domestic sales of iridium, osmium and ruthenium together were 11 per cent higher in 1955 than in 1954. Consumption of these metals by uses was as follows: Chemical 51 per cent, electrical 14, dental and medical 1.

Industrial demand for platinum in the U.S. is expected to continue brisk for the remainder of this year, dominated by the requirements of the petroleum industry. In Britain the market has been quieter and the free price of platinum has drifted downwards from the level of £42 - £42 10s. per oz. prevailing at the beginning of the year. In some quarters, however, renewed buying interest is expected from the oil companies, which may shortly have its impact on the market. Looking further ahead, the world's oil requirements are expected to double in the foreseeable future, while the continued expansion of the electrical and chemical industries seems assured. These trends should be reflected by expanding markets for the platinum-group metals.

QUICKSILVER.—Overshadowing the quicksilver market is the announcement that the British Board of Trade is inviting tenders for the purchase of 1,000 flasks, presumably from its strategic holdings. It is understood that applications have to be in by about the end of July. This sale has come at a time when prices have been trending downwards and the market is generally very unreceptive to additional supplies.

TITANIUM.—A further broadening of world production is indicated by the news that a plan to produce titanium in Norway is currently under negotiation between Norsk Hydro and Titania A/S, the latter company being Norway's sole producers of ilmenite ore. It is understood that the negotiations are unlikely to be concluded before the end of the year.

In Britain a notable step forward in the development of the titanium industry has been taken by the award of a contract for I.C.I.'s £2,000,000 fabrication mill to the H. K. Ferguson Co. of Great Britain Ltd., a subsidiary of the H. K. Ferguson Co. of the U.S. The new mill is to be erected at Waunarlwydd in South Wales and is scheduled for completion by the end of next year. Ferguson will undertake partial design and complete construction management services.

The Titanium Metals Corporation, Nevada, announces that the world's largest titanium ingot-melting furnace has processed its 3,000,000th lb. of metal. The 6,000 lb. ingot now in production represents a substantial increase over the 4,000 lb. ingots pioneered by T.M.C.A. and subsequently standardized throughout the U.S. industry. These larger ingots were developed for continuous-mill hot rolling of wide titanium sheet and also for the production of forgings of large section size.

URANIUM.—According to unofficial estimates, more than 1,000,000 tons of uranium ore are stockpiled at government-owned buying stations. Yet the expansion of ore production still continues. It is reported that some gold mining companies in the U.S. are trying to branch out into uranium in a relatively small way. In Canada Milliken Lake Uranium Mines has received a letter of intent from the Crown-owned Eldorado Mining, providing for the sale of its output of uranium concentrates amounting to $77,250,000. This is the third largest contract so far received by a Canadian company.

ZIRCONIUM.—In view of the prominence accorded to zirconium in the U.S. as a key material in the construction of nuclear plant, it is surprising to learn that in Britain this metal will almost certainly not be needed in the large quantities formerly thought necessary for the atomic power programme. "It may well be," states *The Financial Times*, "that Britain's atomic submarines, unlike the American Nautilus and Sea Wolf, will not require exceptional quantities of this expensive metal for their construction." This is due to the development of several new types of steel and aluminium alloys, which have played an important part in bringing about a general advance in nuclear constructional technique. It would appear, therefore, that to some extent zirconium's future is at the melting point, at any rate so far as the U.K. programme is concerned. However, the melting point of zirconium is extremely high!

There is certainly no indication of a probable reduction in U.S. demand. On the contrary, it was recently reported that one of two prospective Japanese producers planned to start commercial production of zirconium early next year for export to the U.S. The A.E.C. is expected to purchase 100 s.tons from Japan under a barter deal for surplus agricultural commodities.

The London Metal Market

(From Our Metal Exchange Correspondent)

During the period under review the adverse factors mentioned in last week's report have persisted, namely, the holiday season, the steel strike in America, threatened strikes in the U.K. and general reluctance to buy, and the undertone of all the markets has become weaker.

Copper remained steady for some days but on Wednesday the underlying weakness in the position caused a sharp fall, and it is expected that in the absence of favourable news on the strike situation the decline will continue. Although stocks were lower on Monday the technical position of the market seems to be altering, and the backwardation which was forecast for July will probably disappear by the end of the month. In Europe demand is very spasmodic, and in the U.S. most buyers are purchasing dealer-copper at below the custom smelters' quotation. Nothing further has been heard from the Board of Trade in respect of the method of disposal of the 36,000 tons of copper, but it is expected that consultations with the trade will take place before the August Bank Holiday.

In the tin market the steel strike in the U.S. and the troubled labour situation in Malaya have about cancelled each other out, and there has been very little interesting movement in the price. With the statistical position now pointing to no surplus in 1956 there is some speculation as to what would happen if a strike in Malaya, coupled with the settlement of the steel strike in the U.S., led to the price exceeding that visualized in the International Tin Agreement. On Thursday morning the Eastern price was equivalent to £763½ per ton c.i.f. Europe.

The prices for lead and zinc are still being helped by the continuation of the American support policy, but as the general demand is now being affected by the holiday season and by the underlying weakness in the copper price these markets have developed a weaker undertone.

Closing prices and turnovers are given in the following table :—

	July 12		July 19	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£294½	£295	£284	£285
Three months	£292	£293	£283	£284
Settlement	£295		£285	
Week's turnover	5,750 tons		7,150 tons	
Tin				
Cash	£748	£749	£743	£745
Three months	£745	£746	£742	£743
Settlement	£749		£745	
Week's turnover	1,010 tons		635 tons	
Lead				
Current half month	£114½	£115½	£113½	£114
Three months	£112½	£113½	£112½	£112½
Week's turnover	3,000 tons		2,175 tons	
Zinc				
Current half month	£94	£94½	£93½	£93¾
Three months	£92½	£92½	£92¾	£92½
Week's turnover	4,400 tons		3,525 tons	

OTHER LONDON PRICES — JULY 19

METALS

Aluminium, 99.5% £190 10s. per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 250s. 3½d.
Iridium, £29/31 oz.
Manganese Metal (96%-98%) £259/£265 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £34/£35 oz. Imported £36 10s./£37 10s. oz.
Rhodium, £42.
Ruthenium, £15/£17 oz.
Quicksilver, £85 0s. ex-warehouse
Selenium, 112s. nom. per lb.
Silver, 78⅛d. f.oz. spot and 78⅛ f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 60% 8s. 3d. c.i.f.
30% 5s. 0d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (semi-friable) 48% £16 15s. 0d. per ton c.i.f.
,, Hard Lumpy (45%) £16 15s. 0d.
,, Refractory 40% .. £10 15s. 0d. per ton c.i.f.
,, Smalls 42% .. £13 15s. 0d. per ton c.i.f.
Baluchistan .. .. .. £17 5s. 0d. c.i.f.
Magnesite, ground calcined .. £28 0s./£30 0s. d/d
Magnesite, Raw (ground) .. £21 0s./£22 0s. d/d
Molybdenite (85% basis) .. 8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%) .. 252s. 6d./257s. 6d. c.i.f.
Tungsten Metal Powder (98% Min. W.) .. 20s. 8d. nom. per lb. (home)
Ferro-tungsten (80%-85%) .. 17s. 8d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £41 3s. 9d. d/d per ton
Ferro-manganese, home .. £66 per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight .. .. 103d./105d. per unit c.i.f.
Manganese Ore(43%-45%) .. 97d./98d. per unit c.i.f.
Manganese Ore (38%/40%) .. 90d./92d. per unit
Brass Wire .. .. .. 2s. 10¾d. per lb. basis
Brass Tubes, solid drawn .. 2s. 3d. per lb. basis

COMPANY NEWS AND VIEWS

Gold Fields in Canada

It is now officially announced by Consolidated Gold Fields of South Africa that a new company has been formed in Canada under the auspices of Gold Fields American Development, with an authorized capital of $1,000,000. The new company is to be known as New Consolidated Canadian Exploration and will be a wholly-owned subsidiary of the G.F. American company. It is, therefore, a complete subsidiary of Gold Fields itself at one remove.

Readers of *The Mining Journal* will not be surprised with the official release of this news, which was, in fact, forecast in the *Annual Review* for this year. Chairman of the new company will be Mr. C. O. Lindberg, who has been managing G.F. American for a long time past. Mr. B. I. F. Breakey, well-known in Canadian geology circles, is taking the position of general manager. The new undertaking is to take the quick name of "Newconex".

It would be unrealistic to expect much to emerge from the venture in anything approaching the near future. It is thought that in the starting stages attention will be given mainly to Ontario and Quebec and certainly this is still a big enough untapped area to let in someone with ultimate profit with as much exploration know-how as Gold Fields.

By common consent, Gold Fields is fairly liquid with funds at this time. Money, as such, in the hands of mining finance houses of the calibre of Gold Fields, is virtually money wasted other than on a relatively temporary basis. Cecil Rhodes, the founder of Gold Fields, had the South African gold mining industry mainly in mind. But modern metalliferous mining is going a long way beyond gold and a long way beyond the Union. Shareholders in the old established Gold Fields should be gratified to learn that this important house is not standing still. Major new efforts, as already known, are being made to see what mineral wealth East African and the Rhodesias may hold. Canada is now added to the list.

In terms of finance, Gold Fields stands to pull in something of the order of £300,000 gross in respect of its Trinidad Oil holding. There should be additional funds accruing from the Yukon Consolidated deal with Consolidated Zinc.

June Gold Quarterlies Well Received

Under the stimulus of President Eisenhower's return to the White House, together with considerations regarding the inflationary impact which could result from a settlement of the steel strike, Wall Street prices made a broad advance during the past week. Accordingly *The Dow Jones Industrial Index* moved up from 507.44 on July 12 to 513.39 on July 18. Taking their cue from New York, London prices also improved carrying *The Financial Times Industrial Ordinary Index* up to 182.0 from 177.9. The Prime Minister's warning on the dangers of inflation caused little selling.

In the face of good conditions in other sections, Kaffirs acted extremely well and *The Gold Share Index* by July 18 had risen to 83.1 from 82.2 on July 12. Although quarterly reports from the Anglo American, Gold Fields and J.C.I. groups were still being digested, their reception has generally been most favourable and prices on Thursday showed a strong underlying trend. Renewed interest has appeared particularly for O.F.S. issues and most shares have the appearance of being in the early stages of a new upward movement.

Henderson's Expansion

The consolidated balance sheet of Henderson's Transvaal Estates at March 31 1956, revealed an expansion of total assets to £2,142,912 from £1,995,453 at the end of the preceding year. The company's quoted securities shown at a book value of £554,309 (£487,008) had a market worth of £537,859 compared with £487,889. Book entries of both quoted and unquoted investments at £814,806 contrasted with the previous year's

LONDON STOCK EXCHANGE PRICES — JULY 12 - JULY 18, 1956

Finance	Price July 18	+ or — on week
African & European	3½	.....
Anglo American Corpn.	7⅞	—⅛
Anglo-French	21/6	.....
Anglo-Transvaal Consol.	1½	.....
Central Mining (£1 shrs.)	51/6	—3d
Consolidated G'fields	57/6	—9d
Consol. Mines Selection	1⅝	—⅛
East Rand Consols	2/-	.....
General Mining	4	.....
H.E. Prop.	8/10½	+7½d
Johnnies	40/-	.....
Rand Mines	3⅜	.....
Rand Selection	2	—⅛
Union Corporation	40/6	—3d
Vereeniging Estates	4½	.....
Writs	1⅝	.....
West Wits.	39/-	+1/3
Rand Gold		
Blyvoors	22/3	+6d
Brakpan	5/9	—3d
Buffelsfontein	27/9	+1/10½
City Deep	10/3	—6d
Consol. Main Reef	⅜	—⅛
Crown	1⅛	.....
Daggas	2⅜	+⅛
Dominion Reefs	17/3	—6d
Doornfontein	22/-	.....
Durban Deep	1⅞	.....
E. Champs	2/9	.....
E. Daggas	9/-	+3d
E. Geduld (4s. units)	29/3	—3d
E. Rand Props.	48/7½	—4½d
Geduld	3⅞	.....
Govt. Areas	3/9	.....
Grootvlei	18/10½	—3d
Hartebeestfontein	40/-	+1/3
Libanon	7/-	+1½d
Luipards Vlei	13/9	—1½d
Marievale	20/1½	—6d
New Kleinfontein	3/10½	.....
New Pioneer	15/1½	+3d
Randfontein	41/6	.....
Robinson Deep	8/-	.....
Rose Deep	8/6	—9d
Simmer & Jack	3/7½	.....
S.A. Lands	1⅛	+⅛
Springs	2/6	.....
Stilfontein	25/4½	+4½d
Sub Nigel	1⅛	—⅛
Vaal Reefs	32/9	—3d
Van Dyk	2/3	.....
Venterspost	13/1½	.....
Vlakfontein	17/7½	+6d
Vogelstruisbult	17/1½	+3d
West Driefontein	5⅛	+⅛

Rand Gold contd.	Price July 18	+ or — on week
W. Rand Consolidated	1⅜	.....
Western Reefs	30/-	+1/4½
O.F.S. Gold		
Freddies	7/9	+3d
Freddies Consolidated	4/-	.....
F.S. Geduld	4⅛	+⅛
Geoffries	8/4½	—1½d
Harmony	25/6	—3d
Loraine	6/6	+3d
Lydenburg Estates	18/9	+9d
Merriespruit	8/4½	—6d
Middle Wits	12/9	.....
Ofsits	64/-	+9d
President Brand	67/-	+1/3
President Steyn	32/3	+9d
St. Helena	29/6	+6d
Virginia Ord.	10/3	—1½d
Welkom	21/6	.....
Western Holdings	3⅛	.....
West African Gold		
Amalgamated Banket	1/4½	—¼d
Ariston	4/1½	.....
Ashanti	17/-	+6d
Bibiani	2/3	.....
Bremang	1/5½	+¼d
G.C. Main Reef	1/4½	.....
Konongo	1/9	.....
Marlu	1½d	+¼d
Taquah	1/6½	.....
Western Selection	7/6	.....
Australian Gold		
Gold Mines of Kalgoorlie	13/-	+3d
Great Boulder Prop.	11/9	+3d
Lake View & Star	15/10½	+4½d
Mount Morgan	20/6	.....
North Kalgurli	7/1½	+6d
Sons of Gwalia	2/9	.....
Western Mining	9/9	+3d
Miscellaneous Gold		
Cam & Motor	8/-	+1½d
Champion Reef	6/6	.....
Falcon Mines	8/-	.....
Globe & Phoenix	26/3	—1/-
Motapa	10½d	.....
Mysore	3/7½	—1½d
Nundydroog	9/9	—1½d
St. John d'El Rey	27/9	+3/-
Zauas	2⅛	+⅛

Diamonds and Platinum	Price July 18	+ or — on week
Anglo American Inv.	8⅛	—⅛
Casts	23/4½	—3d
Cons. Diam. of S.W.A.	10/6	.....
De Beers Defd. Regd.	5½	+⅛
De Beers Pfd. Regd.	13½	+½
Pots Platinum	12/10½	.....
Waterval	21/9	+3d
Copper		
Bancroft	48/9	+5/-
Chartered	70/6	+3/6
Esperanza	3/3	+1½d
Messina	8¼	+⅛
Nchanga	12⅛	+⅛
Rhod. Anglo-American	5½	+⅛
Rhod. Katanga	27/3	+1/9
Rhodesian Selection	47/9	+6d
Rhokana	38	+½
Rio Tinto	3¼	+⅛
Roan Antelope	26/9	+1/9
Selection Trust	4½	+⅛
Tanks	7⅛	+½
Tharsis Sulphur Br.	4½	.....
Tin (Eastern)		
Ayer Hitam	20/-	.....
Gopeng	9/9	.....
Hongkong	5/4½	.....
Ipoh	23/6	.....
Kamunting	7/9	+3d
Kepong Dredging	3/1½	—1½d
Kinta Tin Mines	15/3	.....
Malayan Dredging	9/6	+1/1½
Pahang	11/4½	—1½d
Pengkalen	13/6	+3d
Petaling	7/9	+3d
Rambutan	25/-xd	—6d
Siamese Tin	8/10½	—1½d
Southern Kinta	14/4½	+1½d
S. Malayan	6/10½	+1½d
S. Tronoh	5/9	.....
Sungei Kinta	14/-	.....
Tekka Taiping	6/4½	+4½d
Tronoh	9/-	+1½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/3	.....
Beralt Tin	44/3	+3d
Bisichi	4/1½	—1½d
British Tin Inv.	21/3	—9d
Ex-Lands Nigeria	2/1½	—1½d
Geevor Tin	15/3	.....

Tin (Nigerian and Miscellaneous) contd.	Price July 18	+ or — on week
Gold & Base Metal	1/3	.....
Jantar Nigeria	4/6	.....
Jos Tin Area	12/3	.....
Kaduna Prospectors	1/6	+1½d
Kaduna Syndicate	2/4½	+3d
London Tin	9/1½	—1½d
United Tin	10½d	.....
Silver, Lead, Zinc		
Broken Hill South	59/-	+3d
Burma Mines	4/7½	+1½d
Consol. Zinc	48/-	—3d
Lake George	13/4½	+1½d
Mount Isa	20/3	+3d
New Broken Hill	39/9	+6d
North Broken Hill	4½	+⅛
Rhodesian Broken Hill	10/9	+4½d
San Francisco Mines	23/6	.....
Uruwira	5/-	+1/-
Miscellaneous		
Base Metals and Coal		
Amal. Collieries of S.A.	46/-	+4½d
Associated Manganese	35/6	.....
Cape Asbestos	9/10½	+1/-
C.P. Manganese	28/-	+1½d
Consol. Murchison	2	+⅛
Natal Navigation	61/-	.....
Turner & Newall	105/6	+5/-
Wankie	17/6	+1/-
Witbank Colliery	4⅛	.....
Canadian Mines		
Dome	$26	.....
Hollinger	$54½	+2
Hudson Bay Mining	$174	+6
International Nickel	$186	+½
Mining Corpn. of Canada	£9½	.....
Noranda	$112½	+1½
Quemont	£9	—½
Yukon	4/9	—3d
Oil		
Apex	39/3	+3d
Attock	38/6	9d
British Petroleum	181/3	4/4½
Burmah	115/7½	+5/7½
Canadian Eagle	66/9	—3d
Mexican Eagle	21/3	.....
Shell	8⅝-xc	+⅛
Trinidad Oil	75/3	—1½d
T.P.D.	48/6	—1/9
Ultramar	43/6	+9d

figure of £772,806. A rise also took place in current assets to £707,115 from £600,868. Mainly responsible for this were deposits and loans at call which at £340,200 moved up from £242,000.

During the past financial year Henderson's made group net profits after taxation of £103,447 against £78,462 previously. After dividends which absorbed £48,599 (same) the balance carried forward moved up to £182,981 from £171,992. Sir Joseph Ball is chairman. Meeting, London, July 24.

Drilling at Kalgoorlie Southern

A report prepared by Western Mining Corporation on recent drilling operations by Kalgoorlie Southern Gold Mines in boreholes S.E.6 and S.E.7, put down to test the Cavalier structure has been described as being most encouraging and warranting further investigation. Reference was also made to other drilling tests in progress some 4,000 ft. south of hole S.E.7. Hole S.E.9 in this vicinity is proceeding satisfactorily and has reached a depth of 1,500 ft. But in order to make a full test, a depth of 5,000 ft.—and possibly more—will have to be reached. It is intended to complete hole S.E.9 and thereafter to drill another traverse further to the south. It was stated that the size of the Cavalier structure, together with the extensive rock alteration revealed by drilling and shown on the surface—justified proceeding with the venture.

Sungei Kinta's Good Year

A high percentage of dredge running time, an improved grade of ground worked, and a higher average price received for tin all contributed to the substantial improvement in Sungei Kinta Tin Dredging's net profit during the year ended December 31, 1955. More specifically, tin ore recovery totalled 330 tons which was double that of the previous year, and net profits rose sharply to £62,548 from only £5,039 during the preceding twelve months. After a dividend of 20 per cent (5 per cent) on the issued ordinary capital of £200,000 in stock units of £1 which absorbed £23,000 (£5,750), the unappropriated balance carried forward expanded to £18,339 from £4,950.

Output for the six months up to the end of June has totalled 187¼ tons against only 135¼ tons during the previous corresponding period of 1955. It should be borne in mind, however, that an exceptionally low grade of ground was worked during the first quarter of 1955 and it would, therefore, be unwise to make a strict comparison between the two periods. As Mr. R. Ellerton Binns has pointed out in his statement to shareholders, a clearer and more comprehensive picture may be obtained if average monthly production levels are taken. A comparison on this basis shows that the current year's figures are well up to those of the last nine months of 1955.

Outlook for Ex-Lands

Although output figures for the first six months of The Ex-Lands Nigeria's financial year ending December 31, 1956, reveal a decline in production of tin concentrates to 286 tons from 319 tons during the previous corresponding period of 1955, this trend should not be regarded as presaging a fall over the year as a whole. Indeed, it seems likely that the company's 230 ton capacity Monighan Dragline should reach production in the very near future.

Ex-Lands' balance sheet at December 31, 1955, showed total assets of £529,803 compared with £522,912 previously. Current assets of £194,513 exceeded current liabilities and reserve for future taxation by £42,161. During the past financial year the company made net profits after tax and all expenses of £31,173 against £26,453. After a dividend of 15 per cent on the issued ordinary capital of £275,732, which absorbed £23,949 (£31,522) the balance unappropriated advanced to £47,931 from £40,707.

As in the case of all tin producing companies the likelihood of some output restriction under the International Tin Agreement during 1957 is a serious consideration. Yet Ex-Lands may, perhaps, be in a better position than most to meet this threat. Already low, its cost structure should be further reduced by the new dragline which—should restriction come—would presumably be made responsible for a large proportion of any output level which might obtain.

Although many current imponderables are apt to make assessments as to what various tin companies might be able to earn under I.T.A. restrictions extremely difficult, the yield of about 14 per cent by Ex-Lands shares at their present level of 2s. 2d. strong suggests that the company's prospects are regarded favourably. Major-Gen. W. W. Richards is chairman. Meeting, London, July 30.

Focus on Australia

Two booklets have been prepared by the Australia and New Zealand Bank as guides for concerns contemplating a subsidiary Company in Australia. They are *Australia's Continuing Development* which describes social, industrial and commercial conditions; and *Company Formation in Australia* which outlines company law and current taxation. Copies of both booklets will be gladly supplied on request.

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850 BRANCHES AND AGENCIES

Kaduna Prospectors' Ore Reserves Decline

During the year ended December 31, 1956, Kaduna Prospectors made a net profit after taxation, of £1,509 compared with £2,723 during the preceding year. Dividends absorbed £1,438 (£2,833) and unappropriated profits carried forward declined to £2,795 from £3,079.

Year to Dec. 31	*Output (tons)*	Sales *(tons)*	*Per ton Ore* (Price)* £	*(Cost)* £	*Tin Sales* £	*Ore Reserves (tons)*
1955	63½	70	529	365	36,994	106½
1954	70	70	521	313	36,478	112

* Computed on f.o.r. basis.

Up to the end of June, 1956, a total of 23½ tons of tin ore had been produced compared with 36 tons during the corresponding period of the past financial year. But this decline should not be taken too seriously as the company hopes to achieve a higher production rate during the coming months.

Referring to the ore reserve position, Captain Hugh Vivian, the Chairman, emphasised the difficulty of foreseeing the company's future. Areas remaining to be worked were decreasing while costs continued their incessant upward trend.

Kaduna Syndicate's Current Production Rate

Although output of tin ore by The Kaduna Syndicate for six months of its current financial year ending December 31, 1956, has improved to 186½ tons from 143 tons during the previous corresponding period, production for the twelve months as a whole, emphasizes Captain Hugh Vivian, the chairman, is not expected to show a proportionate increase.

During the past fianancial year ended December 31, 1955, the company made net profits of £13,364 (£27,123). After dividends which absorbed £11,500 (£18,100), unappropriated profits carried forward fell to £9,852 from £11,729.

Year to Dec. 31	*Output (tons)*	*Sales (tons)*	*Per ton Ore (price)* £	*(cost)** £	*Tin Sales* £	*Ore Reserves (tons)*
1955	241	260	527	277	136,996	552
1954	332	340	511	196	173,667	622

* Computed on f.o.r. basis.

Two factors were mainly responsible for the reduction in output during 1955. Firstly, recovery of ore from the Werran Hill deposit was completed within the first few weeks of the year and overall recovery dropped to .64 lbs. of tin per cu. yd. against .82 lbs. in 1954. Secondly, a strike of African labour caused a serious interruption of operations.

At their present price of around 2s. 3d. x. d. Kaduna Syndicate 1s. ordinary shares yield about 18½ per cent.

Reduced Assets of Phoenix Prince Gold Mining

Reflecting a reduction in issued ordinary capital to £300,000 in shares of 3s. from the previous figure of £500,000 in 5s. shares, Phoenix Prince Gold Mining Company's total assets at March 31, 1956, contracted sharply to £370,864 from £562,054. While fixed assets remained largely unchanged at £238,124 (£248,632), current assets declined to £132,740 from £313,422 and exceeded current liabilities and provisions by about £119,500. During the past financial year Phoenix Prince made total profits of £193,796 compared with £196,904 previously. After taxation and a transfer of £10,000 (same) to general reserve the balance carried forward was virtually unchanged at £12,937 against £12,822.

Mr. Alexander Macquisten is chairman. Meeting, London, July 23.

Company Shorts

Anglo American Subscribes for Rand Selection at 40s.—In order to increase the liquid resources of Rand Selection Corporation, the Anglo American Corporation of South Africa has subscribed for 224,027 5s. shares of the company at 40s. per share.

British Tin Pays Less.—An interim dividend of 7 per cent has been recommended by the British Tin Investment Corporation on its issued ordinary capital of £2,105,086 in 10s. shares. The interim distribution for 1955 was 7½ per cent.

No Interim from Bibiani.—No interim dividend has been recommended by Bibiani (1927) in respect of the year ending September 30, 1956. A 5 per cent interim was paid in respect of the previous year but no final.

Bremang Pays 5 Per Cent.—A dividend of 5 per cent on its issued ordinary capital of £421,685 in stock units of 2s. has been recommended by the Bremang Gold Dredging Company. No distribution had previously been made since 1952.

During the financial year ended December 31, 1955, Bremang made profits before tax of £66,996 compared with a loss during the previous year of £7,546. After all expenses, including taxation of £4,128 (£3,888) and £7,500 (same) in respect of dredge removal, dividend absorbed £12,123 (nil) leaving £44,049 (£1,517) to be carried forward.

New Area for Killinghall Tin.—Payable tin values have been disclosed on the Killinghall Rubber Estate, which lies to the north and east of Killinghall Tin's present mining leases. Agreement has accordingly been made with the Killinghall (Rubber) Development Syndicate to sublease this area—approximately 322 acres in extent—on terms similar to those obtaining in its current subleases. A further 80 acres of the estate is to be test bored by Killinghall Tin and it has been agreed to sublease this area also should results justify such a course.

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NOTICE IS HEREBY GIVEN that the Board of Directors have to-day declared an Interim Dividend (No. 119) on the Issued Capital of the Corporation at the rate of 7.2d. per Unit of Stock, less Income Tax at 8s. 6d. in the £. This Dividend which is in respect of the year ending September 30, 1956, to be payable on and after September 14, 1956, to all Stockholders on the Registers on July 23, 1956.

The Transfer Books will be closed from July 24, 1956, to July 31, 1956, both dates inclusive, for the preparation of Dividend Lists.

By Order of the Board,
E. W. MORGAN, Secretary.

Registered Address:
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July 17, 1956.

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WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE

Applications are invited for the post of Head of the Mining and Geology Department. Duties will commence on September 1, 1956, or such other date as may be arranged.

Candidates should possess high academic qualifications, preferably an Honours Degree in Mining, practical mining experience, and teaching experience, preferably in a Technical College or University.

Salary in accordance with Burnham scale for Heads of Departments Grade IV (£1,365-£25-£1,515). It is anticipated that the salary will be revised to £1,750-£50-£1,900 as from October 1, 1956. A salary above the minimum of the scale may be paid to a suitably qualified candidate.

Further particulars and application form will be sent by the undersigned. Last date for receipt of applications: Friday, August 17, 1956.

E. C. SMITH,
Principal.

July 16, 1956.

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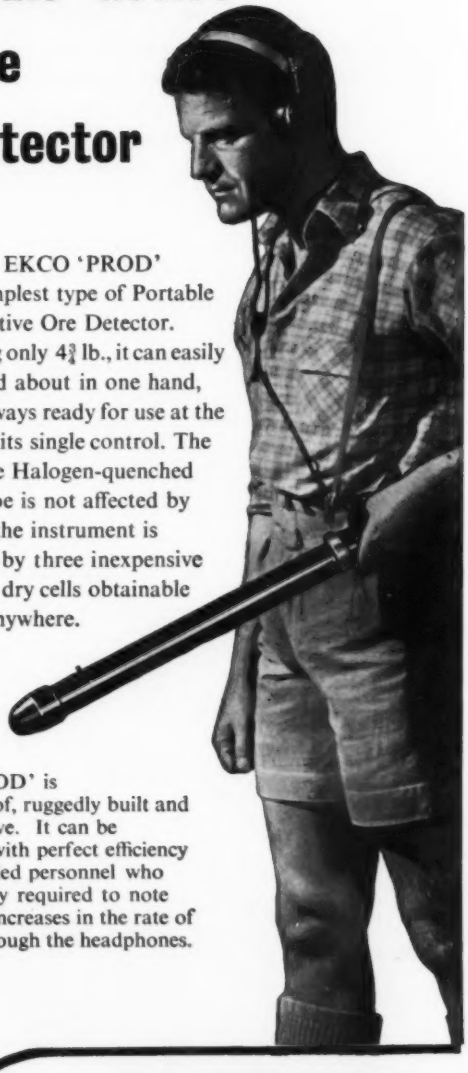

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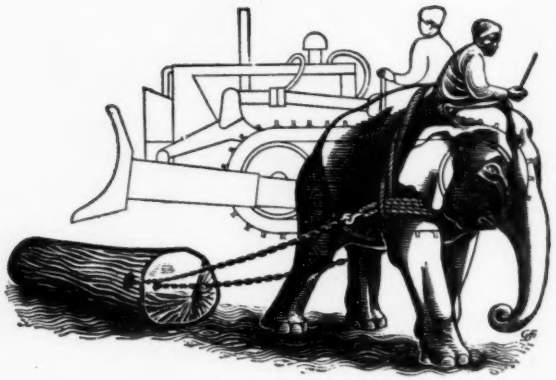

It is impossible to judge from statistics alone how far India's *traditional industries are being reshaped* by Western machines and methods. A first hand experience of Indian life and commerce, like that of the National Bank of India, is needed to put facts into perspective. Enquiries about trade here, or with any other country which is served by the Bank, are welcomed at the Head Office or at any branch.

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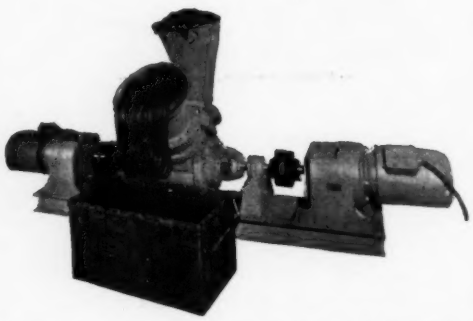

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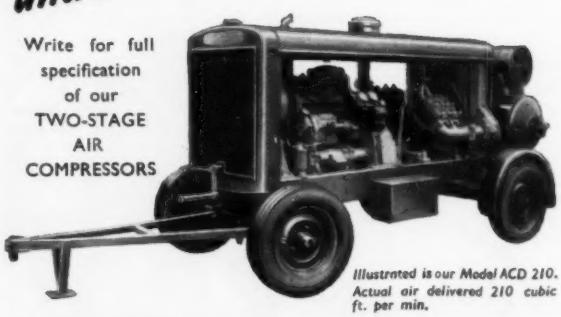

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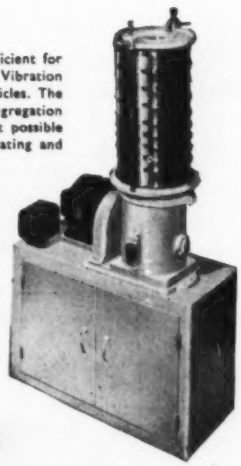

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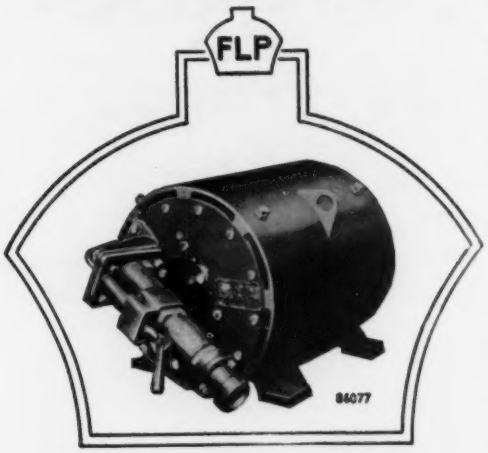

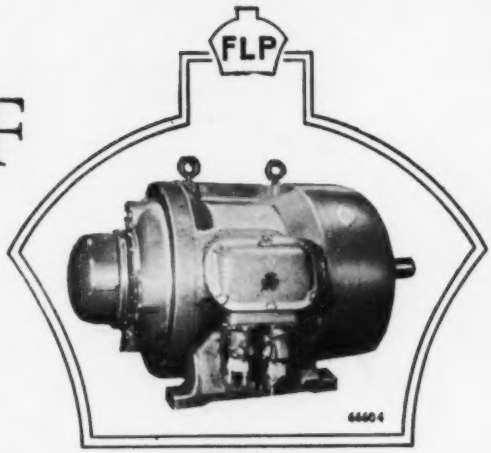

Top Left: *Totally-enclosed fan-cooled flameproof squirrel-cage motor, type KF.*
Top Right: *T.E.F.C. flameproof slipring motor, type FW.*

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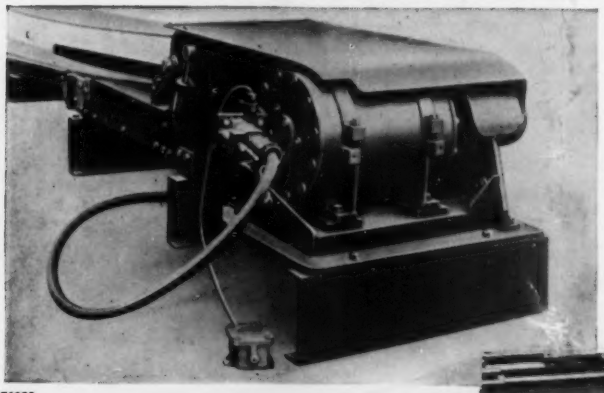

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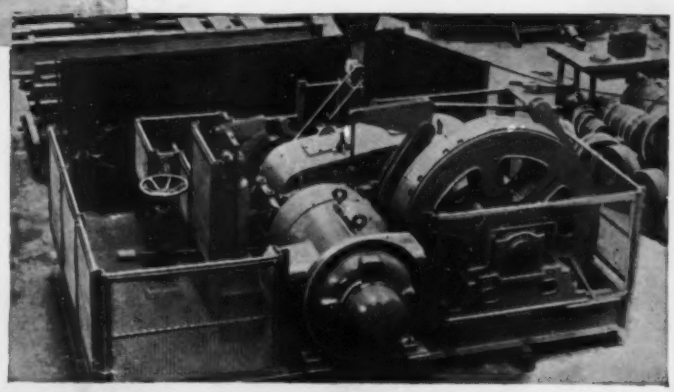

Above: *Type KF flameproof motor driving a "Huwood" conveyor.*
Right: *125 hp, 580 rpm totally-enclosed, fan-cooled, flameproof Metrovick slipring induction motor driving Beckett and Anderson "Man-Riding" haulage for a colliery. Electro-hydraulic thrustor operating main brake is seen on left of motor.*

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